BREEDING STUDIES IN SANSEVIERIA AND KENAF

Annual Report for 1953

James B. Pate

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S A N S E V I E R I A

INTRODUCTIONS - CLONAL SELECTION

During the year several introductions of sansevieria were received and planted at the Hays Farm. Those received during 1953 and certain others obtained prior to 1953 but not listed in the 1952 annual report are given below. The designations of the clones, the date received, location collected and certain other pertinent information are given.

S. trifasciata - clonal introductions:

1. tri C-17. June 1953. San Juan, Puerto Rica. Collected by Mr. Robert Kern, Pan American Airways pilot, Miami, Florida. Planted in Plot 166 sansevieria experiment 52-11.

2. tri C-18. November 1953. Oaxaca, Mexico. Collected by Dr. R. V. Allison. Plot 167 (52-11).

S. trifasciata - parents of hybrids obtained from crosses made in 1952:

1. tri C-7-15. Parent of H52-175. Plot 107 (53-1).
2. tri C-7-16. Parent of H52-105,-111. Plot 108 (53-1).
3. tri C-7-17. Parent of H52-112, -113. Plot 109 (53-1).
4. tri C-7-18. Parent of H52-79, -95. Plot 110 (53-1).
5. tri C-7-19. Parent of H52-114, -116. Plot 111 (53-1).
6. tri C-7-20. Parent of H52-96, -104. Plot 112 (53-1).
7. tri C-7-21. Parent of H52-1, -78. Plot 113 (53-1).
8. tri C-7-22. Parent of H52-144, -152. Plot 114 (53-1).
9. tri C-7-23. Parent of H52-153, -166. Plot 115 (53-1).

SANSEVIERIA

INTRODUCTIONS - CLONAL SELECTION

During the year several introductions of sansevieria were received and planted at the Hoya Farm. Those received during 1953 and certain others obtained prior to 1953 but not listed in the 1952 annual report are given below. The designations of the clones, the date received, location collected and certain other pertinent information are given.

A. Miscellaneous - clonal introductions:

1. Int C-17. June 1953. San Juan, Puerto Rico. Collected by Mr. Robert Kern, Pan American Airways pilot, Miami, Florida. Planted in Plot 166 sansevieria experiment 52-11.

2. Int C-18. November 1953. Oaxaca, Mexico. Collected by R. V. Allison. Plot 167 (52-11).

B. Miscellaneous - parents of hybrids obtained from crosses made in 1952:

1. Int C-7-15. Parent of 852-175. Plot 107 (53-1).
2. Int C-7-16. Parent of 852-105, -111. Plot 108 (53-1).
3. Int C-7-17. Parent of 852-112, -113. Plot 109 (53-1).
4. Int C-7-18. Parent of 852-79, -95. Plot 110 (53-1).
5. Int C-7-19. Parent of 852-114, -116. Plot 111 (53-1).
6. Int C-7-20. Parent of 852-96, -104. Plot 112 (53-1).
7. Int C-7-21. Parent of 852-1, -78. Plot 113 (53-1).
8. Int C-7-22. Parent of 852-114, -152. Plot 114 (53-1).
9. Int C-7-23. Parent of 852-153, -166. Plot 115 (53-1).

10. tri C-7-24. Parent of H52-176. Plot 116 (53-1).

11. tri C-7-25. Parent of H52-177. Plot 117 (53-1).

S. laurentii - clonal introductions:

1. lau C-24. June 1952. Bensons Nursery, Boynton, Florida. Derived from a cutting of the dwarf ornamental, S. hahnii. Plot 98 (52-11).

2. lau C-25. November 1952. Silver Palm Drive, Miami, Florida. Collected by J. Frank Joyner. Plot 110 (52-11).

3. lau C-26. November 1952. 36th Street and Okeechobee Road, Miami, Florida. Collected by J. Frank Joyner. Plot 111 (52-11).

4. lau C-27. August 1951. New York Botanical Gardens. Labeled liberica. Plot 120 (52-11).

5. lau C-28. May 1950. PI 189123. Originally received as a patented chimera, labeled Bantels Sensation. Variegated laurentii was obtained from leaf cuttings. Plot 121 (52-11).

6. lau C-29. August 1951. New York Botanical Gardens. Originally received as S. Emeralda. Variegated laurentii was obtained from leaf cuttings. Plot 122 (52-11).

7. lau C-30. April 1951. Wilsons Gardens, Miami, Florida. Originally received as a light green chimeral type. Variegated laurentii was obtained from leaf cuttings. Plot 15 (52-11).

8. - 16. lau C-31, -39. November 1951. Cuba. Collected by Mr. Elton G. Nelson. Plots 85-92 and 94, 95 (53-1).

10. Ort C-7-24. Parent of M52-175. Plot 116 (53-1).

11. Ort C-7-25. Parent of M52-177. Plot 117 (53-1).

8. Lawrentii - clonal introductions:

1. Jan C-24. June 1952. Bonanza Nursery, Boynton, Florida. Derived from a cutting of the dwarf ornamental. 8. Prunia. Plot 96 (52-11).

2. Jan C-25. November 1952. Silver Palm Drive, Miami, Florida. Collected by J. Frank Joyner. Plot 110 (52-11).

3. Jan C-26. November 1952. 58th Street and Okeechobee Road, Miami, Florida. Collected by J. Frank Joyner. Plot 111 (52-11).

4. Jan C-27. August 1951. New York Botanical Gardens, labeled Alberica. Plot 120 (52-11).

5. Jan C-28. May 1950. PI 180725. Originally received as a potented chimera, labeled Bartala Sensation. Verified Lawrentii was obtained from leaf cuttings. Plot 121 (52-11).

6. Jan C-29. August 1951. New York Botanical Gardens. Originally received as 8. Imperialis. Verified Lawrentii was obtained from leaf cuttings. Plot 122 (52-11).

7. Jan C-30. April 1951. Milnora Gardens, Miami, Florida. Originally received as a light green chimeral type. Verified Lawrentii was obtained from leaf cuttings. Plot 15 (52-11).

8. - 16. Jan C-31. -39. November 1951. Cuba. Collected by Mr. Hilton D. Nolan. Plots 85-92 and 94. 95 (53-1).

S. laurentii - parents of hybrids obtained from crosses made in 1952:

1. lau C-4-2. Parent of H52-79, -116. Plot 101 (53-1).
2. lau C-4-3. Parent of H52-29, -41. Plot 102 (53-1).
3. lau C-4-4. Parent of H52-26, -28. Plot 103 (53-1).
4. lau C-4-5. Parent of H52-18, -25. Plot 104 (53-1).
5. lau C-4-6. Parent of H52-42, -78. Plot 105 (53-1).
6. lau C-4-7. Parent of H52-139, -142. Plot 106 (53-1).
7. lau C-14-3. Parent of H52-13, -17. Plot 97 (53-1).
8. lau C-14-4. Parent of H52-2, -12. Plot 98 (53-1).
9. lau C-14-5. Parent of H52-143. Plot 99 (53-1).
10. lau C-14-6. Parent of H52-174. Plot 100 (53-1).

S. guineensis - clonal introductions:

1. gui C-15. November 1952. Key West, Florida. Collected by J. Frank Joyner. Plot 108 (52-11).

2. gui C-16. November 1952. Sugar Loaf Key, Florida. Collected by J. Frank Joyner. Plot 109 (52-11).

3. - 8. gui C-17, -22. November 1951. Collected by Mr. Elton G. Nelson. Plots 82-84, 90, 93, 96 (53-1).

Other species:

1. S. spicata. March 1950. Atkins Gardens, Cienfuegos, Cuba. Plot 139 (52-11).

2. S. species. April 1951. Wilsons Gardens, Miami, Florida. Plot 118 (52-11).

3. S. species. March 1953. PI 206124. Moravia, Liberia. From C. R. Orten, TCA. A broad leaf type similar to guineensis. Plot 137 (52-11).

B. Jungermannia - cultures of hybrids obtained from crosses made in 1952:

1. Jan C-4-8. Parent of H52-79, -116. Plot 103 (53-1).

2. Jan C-4-3. Parent of H52-29, -41. Plot 102 (53-1).

3. Jan C-4-4. Parent of H52-26, -28. Plot 103 (53-1).

4. Jan C-4-5. Parent of H52-18, -25. Plot 104 (53-1).

5. Jan C-4-6. Parent of H52-42, -78. Plot 105 (53-1).

6. Jan C-4-7. Parent of H52-139, -142. Plot 106 (53-1).

7. Jan C-14-3. Parent of H52-13, -17. Plot 97 (53-1).

8. Jan C-14-4. Parent of H52-2, -12. Plot 98 (53-1).

9. Jan C-14-5. Parent of H52-143. Plot 99 (53-1).

10. Jan C-14-6. Parent of H52-174. Plot 100 (53-1).

C. Lejeunea - clonal introductions:

1. Jet C-15. November 1952. Key West, Florida. Collected by Frank Joyner. Plot 108 (52-11).

2. Jet C-16. November 1952. Sugar Loaf Key, Florida. Collected by Frank Joyner. Plot 109 (52-11).

3. - 8. Jet C-17, -22. November 1951. Collected by Dr. Elton Nelson. Plots 83-84, 90, 93, 96 (53-1).

Other species:

1. B. pulcella. March 1950. Azalea Gardens, Clearwater, Cuba. Plot 139 (52-11).

2. B. species. April 1951. Williams Gardens, Miami, Florida. Plot 118 (52-11).

3. B. species. March 1953. PI 206134. Norcia, Liberia. From C. R. Orton, TCA. A broad leaf type similar to pulchella. Plot 137 (52-11).

These introductions and those listed in the 1952 annual report are planted at the Hays Farm. During the year special attention has been given to establishing a 6 x 9 foot plot of each in nursery observation trials. For most introductions a complete plot has been established. Variable amounts of planting stock, different dates of planting and other factors have caused wide differences between plots. Where the plots are well established, it seems advisable to cut them back uniformly to standardize the age of growth. After regrowth, differences between clones of the same species and differences between species should be more readily apparent.

Two clonal selection experiments have now been planted. In sansevieria 52-4, twelve clones collected in Florida are being compared in 9 x 12 foot plots with four replications. Approximately 18 months after planting data were taken on number of plants per leaf cutting. One row per plot was sampled in this plant count. Approximately one and two years after planting data were taken on length of leaf. Ten leaves per plot were measured. These data were analyzed statistically and are presented in Table 1. Differences between clones in number of plants per cutting were highly significant. Clone tri C-7 (original trifasciata collection) had the greatest number of plants in the trifasciata group. The laurentii clones were similar in number of plants, and in the guineensis group, gui C-12 had the largest number of plants.

Differences between clones in leaf length were significant at both dates. However, gui C-11 had the greatest leaf length on both dates. In the trifasciata group, tri C-14 was best. The leaf length

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Differences between clones in leaf length were significant at both dates. However, jml 0-11 had the greatest leaf length on both dates. In the trifoliata group, tri 0-14 was best. The leaf length

of the laurentii clones was equal to or better than many of the other clones at the end of the first year, but the characteristic short leaf of laurentii is beginning to show up at the end of the second year. Generally for all clones leaves were approximately 1 foot in length at the end of the first year's growth and 2 feet in length at the end of the second year.

In sansevieria 52-16, three clones of trifasciata, 1 of laurentii, 1 of liberica and PI 183531 are being compared in 9 x 12 foot plots replicated 4 times. Data on percent dead cuttings and number of plants per cutting are presented in Table 2. The data show that it is almost impossible to propagate lib C-2 and PI 183531 from leaf cuttings. Clone tri C-7 (original trifasciata collection) had the greatest number of plants per cutting.

Clone lib C-2 was separated from the original liberica (lib C-1) because of its greater number of leaves per plant. The leaves are also longer and narrower. It appears to be as difficult to propagate as lib C-1. PI 183531 is similar to liberica except for its longer leaves. In the establishment of these two clones in nursery observation trials treatment of the leaf cuttings with a rooting hormone powder containing 0.1% indolebutryic acid has not been effective in increasing the number of plants produced. These two clones appear to be too difficult to propagate to be of much value for fiber.

Since it was not possible to establish lib C-2 and PI 183531 in experiment 52-16, trifasciata seedling clone tri S 49-1 and lau C-9 from Winter Haven were substituted. Plants of the two

clones were planted placing approximately the same number per row as in the established plots of the experiment.

Table 1. Number of plants per leaf cutting and length of leaf in sansevieria clonal selection experiment. Sansevieria experiment 52-4 planted January 1952.

Clone	Location Collected	No. Plants 6/25/53	Leaf length, in. 1/15/53	12/20/53
tri C-5	Arcadia	3.4	10.8	20.7
tri C-7	Arcadia	4.1	11.5	20.8
tri C-8	Homestead	3.0	11.4	24.5
tri C-12	Arcadia	3.1	9.7	19.0
tri C-13	Winter Haven	2.9	11.8	23.6
tri C-14	Dania	3.1	13.2	25.5
lau C-4	Boynton	3.4	12.6	20.8
lau C-5	Jupiter	3.6	12.7	20.5
lau C-15	Boynton	3.4	11.9	20.2
gui C-7	Boynton	3.8	12.0	19.9
gui C-11	Terra Ciea	3.5	15.9	26.6
gui C-12	Boynton	4.4	14.0	24.2
LSD (.05)		0.7	1.4	5.0
LSD (.01)		1.0	1.9	6.7

Analysis of Variance

Source	DF	Mean Squares		
		No. Plants 6/25/53	Leaf Length 1/15/53	12/20/53
Reps.	3	.66	2.51	6.04
Clones	11	.85**	10.20**	25.85*
Error	33	.26	.94	12.02

*Significant
**Highly significant

Table 1. Number of plants per leaf cutting and length of leaf in centavalia clonal selection experiment. Centavalia experiment 52-4 planted January 1952.

Clone	Location Collected	No. Plants 6/25/53	Leaf Length, in. 1/13/53	12/20/53
Int C-5	Arcadia	3.4	10.8	20.7
Int C-7	Arcadia	4.1	11.3	20.3
Int C-8	Homestead	3.0	11.4	24.3
Int C-12	Arcadia	3.1	9.7	19.0
Int C-13	Winter Haven	2.9	11.8	23.8
Int C-14	Davie	3.1	13.2	25.3
Ian C-4	Boynton	3.4	12.6	20.8
Ian C-5	Jupiter	3.6	12.7	20.5
Ian C-15	Boynton	3.4	13.9	20.2
Gut C-7	Boynton	3.8	12.0	19.9
Gut C-11	Terra Ceia	3.3	15.9	26.6
Gut C-12	Boynton	4.4	14.0	24.2
LSD (.05)		0.7	1.4	5.0
LSD (.01)		1.0	1.9	6.7

Analysis of Variance

Source	DF	Mean Squares No. Plants 6/25/53	Leaf Length 1/13/53	12/20/53
Reps.	3	.68	2.22	6.04
Clones	11	.85**	10.80**	25.55**
Error	33	.25	.94	12.02

*Significant
**Highly significant

Table 2. Percent dead cuttings and number of plants per leaf cutting in sansevieria clonal selection experiment. Sansevieria experiment 52-16 planted November 1952.

Clone	Location Collected	% Dead Cuttings 6/25/53	No. Plants 12/20/53
tri C-2	Bradenton	7.5	1.56
tri C-7	Arcadia	10.9	1.96
tri C-9	Costa Rica	15.2	1.12
lau C-1	Sebring	12.2	1.75
lib C-2	Africa	37.6	0.03
PI 183531	Africa	66.0	0.02
LSD (.05)			.26
LSD (.01)			.35

Analysis of Variance - Number of Plants

Source	DF	MS
Reps.	3	.036
Clones	5	2.955**
Error	15	.028

**Highly significant

Table 2. Percent dead cutting and number of plants per leaf cutting in seasonvieta clonal selection experiment, Sanseviera cylindrica 39-45 planted January 1957.

Clone	Location Cultivated	% Dead Cuttings 6/25/57	No. Plants 12/20/57
Wri 0-2	Pretoria	7.5	1.39
Wri 0-7	Arcadia	10.9	1.95
Wri 0-9	Costa Rica	15.2	1.12
Ian 0-1	Sebring	12.2	1.75
Ith 0-2	Africa	37.6	0.08
PI 128931	Africa	66.0	0.02
LSD (.05)			.86
LSD (.01)			.35

Analysis of Variance - Number of Plants

Source	DF	MS
Reps.	3	.036
Clones	5	2.955**
Error	15	.028

**Highly significant

Figure 1. Inflorescence of S. ehrenbergii, PI 183582, September 1953. Note the branching and length of the inflorescence. It was not possible to use this species in any hybridization studies, because other species were not in flower in September. Photograph by J. Frank Joyner.

Figure 1. Inflorescence of S. glaucophylla, FI 183982, September 1953. Note the branching and length of the inflorescence. It was not possible to use this species in any hybridization studies, because other species were not in flower in September. Photograph by I. Frank Hopper.

SEEDLING SELECTION IN S. TRIFASCIATA

Two hundred and ninety-two trifasciata seedlings from seed planted in 1949 and 1950 were space planted at Fort Lauderdale during 1951 and 1952 in five seedling blocks. Since planting in the field all seedlings have been treated similarly with respect to fertilizer and control of weeds. In the 1952 annual report wide differences in seedling vigor measured by number of plants and leaf length were reported. Generally these differences were correlated with the vigor of the seedling when transplanted to the field. Differences in rhizome length, leaf color and variegation pattern were also noted.

During 1953 data on number of plants of each of the 292 seedling clones were taken in April and December. Length of longest leaf was measured in December. These data are presented in tables 3-7. Number of plants and leaf length in October 1952 are also presented to give a picture of growth over a period of 14 months. Wide differences in the seedling clones in number of plants and leaf length at all dates are shown. There was a good increase in number of plants in the most vigorous clones, but there was little increase in some of the low vigor clones. There was an increase in leaf length in all clones, but the increase was much greater in some than others.

During 1952, fifty-seven of the most vigorous seedling clones were selected and a 6 x 9 foot plot of each started in one of the nursery observational trials at the Hays Farm. In 1953 an additional 36 of the clones were selected and a 6 x 9 foot plot of each planted at Fort Lauderdale. In August 1953 the 93 selected seedlings clones

SEEDLING SELECTION IN S. TRIFASCIATA

were sampled for percent fiber. A sample consisting of three leaves was taken from the original seedling clump at Fort Lauderdale. The longest mature leaves of each clonal clump were taken for these fiber determinations. The samples were retted and cleaned by hand. The percent fiber of the selected seedlings is given in tables 3-7. The percent fiber of the 93 seedling clones ranged from 1.89 to 0.48 and was quite low for a large number. However, in many of the clones even the longest leaves are not of sufficient length to be considered good fiber leaves.

During 1953 considerable soft rot has developed in some of the seedling clones, particularly in the blocks which were first transplanted. In some clones the infection is severe with most plants affected. In others there is little or no infection.

In the immediate future reorganization of the seedling blocks is planned. When the seedlings were transplanted three foot spacings were used. The seedling clumps have become large enough to need more space to prevent mixing. In the reorganization it is planned that 95 of the poorest clones will be discarded. A few low vigor clones will be retained for comparison with the best ones. After elimination of the 95 clones the blocks will be revised to give each of the remaining clones 6 or 8 foot spacings.

Sufficient planting stock of many of these seedling clones is now available for the establishment of cold tolerance tests. These tests probably will be planted at Belle Glade this spring. This will also give another location for collection of soft rot and other data on the seedling clones.

The planned revision of the seedling blocks to give the clones more space and the increasing age and size of the clone should give

a truer picture of mature growth. It will allow for the collection of larger more reliable samples for fiber determinations. The continued growth and maintenance of the original seedling clump and the establishment of 6 x 9 foot plots of the best ones will give sufficient planting stock to plant replicated yield trials of some of these seedling clones in the near future.

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Table 3 . Number of plants, length longest leaf and percent fiber of S. trifasciata seedlings. (Seed were planted in greenhouse in 1949, seedlings transplanted to field at Belle Glade in 1950 and moved to Fort Lauderdale March 1951. Sansevieria Experiment 51-5)

Seedling Number	Number of Plants			Leaf Length, in.		% Fiber
	9/16/52	4/21/53	12/8/53	9/16/52	12/8/53	8/12/53
tri S49-1	21	43	57	22	31	1.89
-2	10	21	24	14	20	1.73
-3	8	19	22	14	26	1.37
-4	14	20	29	10	18	0.74
-5	16	27	35	15	28	1.13
-6	13	22	35	10	18	
-7	22	30	54	14	22	1.60
-8	11	20	34	17	29	1.09
-9	7	22	27	12	19	1.54
-10	11	25	33	14	20	1.47
-11	7	19	27	10	17	1.28
-12	9	18	26	17	24	1.02
-13	6	16	25	19	25	1.42
-14	13	25	29	15	17	1.00
-15	12	27	30	12	18	1.10
16	7	12	15	11	23	
-17	10	28	33	12	21	
-18	6	16	18	10	13	
-19	14	21	33	12	24	
-20	8	17	19	15	25	1.47
-21	7	22	25	8	17	0.82
-22	3	11	14	10	17	
-23	6	18	19	13	22	
-24	12	21	27	12	13	
-25	11	25	28	13	26	1.10
-26	5	16	22	13	20	
-27	5	14	16	11	18	1.34
-28	7	16	26	11	20	
-29	7	16	19	11	20	
-30	8	18	23	12	25	
-31	7	17	21	8	20	
-32	3	8	9	11	22	
-33	5	14	16	11	23	
-34	2	7	10	9	20	
-35	5	12	16	14	21	
-36	8	17	29	10	21	
-37	4	10	10	11	17	
-38	4	7	8	9	19	
-39	2	5	7	9	18	
-40	4	10	12	10	13	0.82
-41	9	24	32	8	16	1.05

Table 3 . Number of plants, length longest leaf and percent fiber of *S. triquetrifolia* seedlings. (Seed were planted in greenhouse in 1949, seedlings transplanted to field at Belle Glade in 1950 and moved to Fort Lauderdale March 1951. Measurements 21-45)

Seedling Number	Number of Plants 9/10/52	4/21/53	12/5/53	9/10/52	12/5/52	% Fiber 8/12/53
Col 849-1	21	43	57	22	31	1.89
-2	10	21	24	14	20	1.75
-3	8	19	22	14	24	1.87
-4	14	30	29	16	18	0.74
-5	16	27	35	15	28	1.23
-6	13	22	36	10	13	
-7	22	30	34	14	22	1.60
-8	11	20	24	17	20	1.09
-9	7	22	27	12	19	1.54
-10	11	25	33	14	20	1.47
-11	7	19	27	10	17	1.28
-12	9	18	24	17	24	1.08
-13	6	16	25	19	25	1.42
-14	13	25	29	15	17	1.00
-15	12	27	30	12	18	1.10
16	7	12	15	13	23	
-17	10	28	33	12	21	
-18	6	16	18	10	13	
-19	14	21	33	18	24	
-20	8	17	19	15	25	1.49
-21	7	23	25	8	17	0.82
-22	3	11	14	10	17	
-23	6	18	19	13	22	
-24	12	23	27	12	13	
-25	11	25	26	13	26	1.10
-26	5	16	22	13	20	
-27	5	14	16	11	18	1.34
-28	7	16	26	11	20	
-29	7	16	19	12	26	
-30	8	18	23	12	25	
-31	7	17	21	8	20	
-32	3	8	9	11	22	
-33	3	14	16	11	23	
-34	2	7	10	9	20	
-35	5	12	16	14	21	
-36	6	17	20	10	21	
-37	4	10	10	11	17	
-38	2	7	8	9	19	
-39	4	5	7	9	18	
-40	9	10	12	10	13	0.82
-41	9	24	32	8	16	1.05

Table 3 . (Cont.)

Seedling Number	Number of Plants 9/16/52	4/21/53	12/8/53	Leaf Length, in. 9/16/52	12/8/53	% Fiber 8/12/53
tri S49-42	3	7	12	9	14	
-43	4	7	16	12	16	
-44	3	6	6	4	8	
-45	8	21	24	10	16	
-46	9	12	22	9	20	
-47	4	12	13	14	24	1.37
-48	6	9	20	8	15	
-49	9	21	34	10	17	0.96

Table 4. Number of plants, length longest leaf and percent fiber of S. trifasciata seedlings. (Seed were planted in greenhouse March 1950, seedlings transplanted to Jupiter April 1951 and moved to Fort Lauderdale March 1952. Sansevieria Experiment 51-11)

Seedling Number	Number of Plants			Leaf Length, in.		% Fiber
	9/16/52	4/21/53	12/8/53	9/16/52	12/8/53	8/12/53
tri S50-1	4	9	18	12	21	0.75
-2	2	8	12	6	16	
-3	5	8	17	5	14	
-4	2	3	4	4	16	
-5	3	10	13	7	18	
-6	4	7	18	7	14	
-7	3	8	16	6	17	0.66
-8	4	8	15	6	20	
-9	2	4	5	7	17	
-10	2	7	9	9	18	0.69
-11	5	14	21	7	19	0.62
-12	5	12	21	9	21	1.35
-13	2	6	12	6	16	
-14	5	12	22	8	18	1.21
-15	1	1	2	6	17	
-16	3	7	14	9	25	1.21
-17	4	4	11	6	12	
-18	3	9	13	6	15	1.02
-19	3	3	4	6	14	
-20	9	12	12	5	12	
-21	3	6	9	6	21	0.48
-22	4	8	16	8	18	
-23	3	7	12	7	21	
-24	7	12	18	8	16	
-25	5	8	16	6	12	
-26	3	6	14	6	18	
-27	2	5	12	8	21	1.05
-28	3	6	6	5	15	
-29	2	4	8	7	19	
-30	4	14	13	8	24	1.33
-31	2	4	6	6	12	
-32	1	4	6	7	18	0.69
-33	6	12	23	7	17	
-34	3	9	18	8	19	0.78
-35	4	10	16	8	16	1.17
-36	2	2	3	5	12	
-37	3	11	18	10	20	
-38	2	5	10	6	16	
-39	2	8	16	6	16	
-40	3	6	10	5	9	
-41	1	1	3	7	17	
-42	2	2	4	5	13	

Table 4. Number of plants, length longest leaf and percent fiber of 6. trifasciata seedlings. (Seed were planted in greenhouse March 1950, seedlings transplanted to flats in April 1951 and moved to Fort Lauderdale in March 1952. Harvested in September 51-11)

Seedling Number	Number of Plants 9/15/52	4/23/53	10/8/53	Leaf Length, in. 9/15/52	10/8/53	% Fiber 9/15/52
4x4 B59-1	4	9	18	12	21	0.75
-2	2	8	12	6	15	
-3	5	8	17	5	14	
-4	2	3	4	4	16	
-5	3	10	13	7	16	
-6	4	7	18	7	14	
-7	3	8	16	6	17	0.86
-8	4	8	15	6	20	
-9	2	4	5	7	17	
-10	2	7	9	9	18	0.69
-11	5	14	21	7	19	0.92
-12	5	12	21	9	21	1.35
-13	2	6	12	6	16	
-14	2	12	22	8	18	1.21
-15	1	1	2	6	17	
-16	3	7	14	9	25	1.01
-17	4	4	11	6	12	
-18	3	9	13	6	15	1.08
-19	3	3	6	6	14	
-20	2	12	12	7	18	
-21	3	6	9	8	21	0.48
-22	4	8	16	8	18	
-23	3	7	12	7	21	
-24	1	12	14	8	10	
-25	3	9	15	8	12	
-26	3	6	14	6	16	
-27	2	5	12	8	21	1.03
-28	3	6	6	8	15	
-29	2	4	8	7	19	
-30	4	14	13	11	24	1.33
-31	4	6	6	8	18	
-32	4	6	6	7	16	0.69
-33	6	12	23	7	17	
-34	3	9	16	8	20	0.73
-35	4	10	16	9	16	1.17
-36	2	2	3	5	17	
-37	3	12	18	10	20	
-38	3	5	10	6	16	
-39	3	8	16	6	16	
-40	3	6	10	8	9	
-41	1	3	7	7	17	
-42	2	4	8	8	13	

Table 4 . (Cont.)

Seedling Number	Number of Plants 9/16/52	4/21/53	12/8/53	Leaf Length, in. 9/16/52	12/8/53	% Fiber 8/12/53
tri S50-43	1	3	3	6	13	
-44	4	8	12	6	25	
-45	6	10	25	5	16	
-46	6	16	32	6	16	0.68
-47	4	10	15	6	16	0.74
-48	2	4	7	6	13	
-49	2	6	17	9	29	0.64
-50	1	3	5	8	20	
-51	5	9	17	10	30	0.53
-52	5	7	16	7	16	0.65
-53	3	7	16	7	16	
-54	5	9	14	7	13	
-55	4	4	8	6	12	
-56	1	4	7	5	14	
-57	2	5	7	6	12	
-58	6	8	10	5	11	
-59	2	5	11	7	13	
-60	2	8	14	10	21	
-61	1	2	6	7	23	0.72
-62	2	9	12	10	16	0.97
-63	5	13	18	10	29	0.86

Table V . (Cont.)

Seedling Number	Number of Plants 9/26/52	11/21/52	12/9/52	9/2	Leaf Length, in. 12/9/52	2/24/53	% Mber 2/24/53
Ari 830-43	1	3	3	6	19		
-44	4	8	12	6	25		
-45	6	10	25	5	16		
-46	6	14	22	6	16		0.69
-47	4	10	15	6	16		0.74
-48	2	4	7	6	13		
-49	2	6	17	9	29		0.64
-50	1	3	5	8	26		
-51	5	9	17	12	30		0.85
-52	5	7	15	7	16		0.65
-53	3	7	16	7	16		
-54	5	9	14	7	13		
-55	4	4	8	6	12		
-56	1	1	7	5	14		
-57	2	5	7	6	12		
-58	6	8	10	5	11		
-59	2	5	11	7	13		
-60	2	8	14	10	20		
-61	1	2	6	7	23		0.72
-62	2	9	12	10	16		0.77
-63	5	13	18	10	29		0.85

Table 5 . Number of plants, length longest leaf and percent fiber of S. trifasciata seedlings. (Seed were planted in greenhouse March 1950, seedlings transplanted to Fort Lauderdale May 1951. Sansevieria Experiment 51-12)

Seedling Number	Number of Plants			Leaf Length, in.		% Fiber
	9/16/52	4/21/53	12/8/53	9/16/52	12/8/53	8/12/53
tri S50-64	15	30	45	15	30	1.08
-65	5	11	16	11	23	
-66	9	17	35	16	26	0.83
-67	7	21	36	16	26	1.70
-68	5	13	21	7	15	
-69	6	21	30	11	18	1.08
-70	8	15	22	8	25	
-71	4	10	20	8	16	
-72	12	22	25	13	21	0.99
-73	8	14	22	10	25	1.44
-74	12	24	31	11	27	
-75	7	21	30	15	19	1.24
-76	5	14	15	9	19	
-77	6	9	12	11	20	
-78	8	12	24	9	19	
-79	12	33	44	12	17	0.87
-80	11	37	58	14	27	1.05
-81	6	18	24	7	17	
-82	11	23	36	15	25	1.02
-83	13	26	34	15	25	1.31
-84	5	15	31	14	25	0.74
-85	7	12	24	12	24	
-86	9	21	34	11	16	
-87	6	16	30	16	32	0.92
-88	4	13	10	8	21	
-89	9	20	30	8	14	
-90	15	23	36	10	28	1.33
-91	10	17	29	8	17	
-92	12	25	42	11	19	
-93	8	16	30	12	19	0.84
-94	7	16	22	13	21	
-95	6	14	23	9	19	
-96	4	7	13	8	21	
-97	7	9	12	11	24	
-98	5	9	11	6	13	
-99	6	15	27	14	23	1.33
-100	7	18	28	14	25	0.90
-101	11	17	32	10	18	0.94
-102	2	5	6	6	12	
-103	4	10	13	9	17	
-104	9	29	52	10	16	

Table 5 . Number of plants, length longest leaf and percent fiber of S. trifasciata seedlings. (Seed were planted in greenhouse March 1950, seedlings transplanted to Fort Lauderdale May 1951. Measurements performed 51-52)

Seedling Number	Number of Plants 9/11/52	4/22/53	12/8/53	Leaf Length, in. 9/15/52	12/8/53	% Fiber 8/13/53
tri 850-64	15	30	45	19	30	1.08
-65	5	11	16	11	23	
-66	9	17	35	16	26	0.83
-67	7	21	36	16	26	1.70
-68	5	19	21	7	15	
-69	6	21	30	11	18	1.08
-70	8	19	22	8	25	
-71	4	10	20	8	16	
-72	12	22	25	13	21	0.99
-73	8	14	22	10	25	1.44
-74	12	24	31	11	27	
-75	7	21	30	15	19	1.84
-76	5	14	15	9	19	
-77	6	9	12	11	20	
-78	8	12	24	9	19	
-79	12	23	44	12	17	0.67
-80	11	37	50	14	29	1.05
-81	6	18	24	7	17	
-82	11	23	36	15	25	1.02
-83	13	26	34	15	25	1.31
-84	5	15	31	14	25	0.74
-85	7	12	24	12	24	
-86	9	21	34	11	16	
-87	6	16	30	16	32	0.92
-88	4	13	10	8	21	
-89	9	20	30	8	14	
-90	15	23	36	16	28	1.33
-91	10	17	29	8	17	
-92	12	23	42	11	19	
-93	8	16	30	12	19	0.84
-94	7	16	22	13	21	
-95	6	14	23	9	19	
-96	4	7	13	8	21	
-97	7	9	12	11	24	
-98	5	9	11	6	13	
-99	6	15	27	14	23	1.33
-100	7	18	28	11	25	0.90
-101	11	17	32	10	18	0.94
-102	2	5	6	6	12	
-103	4	10	13	9	17	
-104	9	29	52	10	16	

Table 5. (Cont.)

Seedling Number	Number of Plants 9/16/52	4/21/53	12/8/53	Leaf Length, in. 9/16/52	12/8/53	% Fiber 8/12/53
tri S50-105	3	6	6	7	13	
-106	9	25	37	11	31	0.81
-107	6	14	19	9	13	
-108	7	17	23	13	24	0.96
-109	6	14	22	12	24	
-110	7	11	21	14	22	
-111	6	22	37	14	23	1.16
-112	7	13	19	5	14	
-113	7	24	29	13	23	1.46
-114	4	8	12	12	21	
-115	7	18	28	12	31	0.68
-116	8	17	32	8	18	
-117	5	14	19	16	36	0.81
-118	3	8	13	12	21	0.91
-119	8	19	19	8	15	
-120	7	19	26	8	20	0.98
-121	4	15	17	18	23	
-122	4	11	21	15	26	
-123	2	3	5	7	14	

Table 5. (Cont.)

Seedling Number	Number of Plants 9/25/52	4/21/53	5/2/53	Leaf Length, in. 9/25/52	12/8/52	6/12/53	Fiber
Trl 550-105	3	6	6	7	13		
-106	9	25	27	11	23		0.81
-107	6	14	15	9	19		
-108	7	17	29	15	24		0.98
-109	6	14	28	12	21		
-110	7	11	21	14	22		
-111	8	22	27	14	23		1.14
-112	7	13	15	9	14		
-113	7	24	28	13	23		1.46
-114	4	8	12	12	21		
-115	7	15	28	12	21		0.69
-116	8	17	28	8	18		
-117	5	14	19	16	26		0.81
-118	3	8	13	12	21		0.71
-119	8	19	19	8	13		
-120	7	19	26	8	20		0.98
-121	4	15	17	13	29		
-122	4	11	21	15	26		
-123	2	3	5	7	14		

Table 6. Number of plants, length longest leaf and percent fiber of S. trifasciata seedlings. (Seed were planted in greenhouse March 1950, seedlings transplanted to Fort Lauderdale August 1951. Sansevieria Experiment 51-18)

Seedling Number	Number of Plants			Leaf Length, in.		% Fiber
	9/16/52	4/21/53	12/8/53	9/16/52	12/8/53	8/12/53
tri S50-124	9	13	28	11	24	
-125	8	16	19	9	22	
-126	7	20	35	10	18	
-127	11	32	45	12	20	0.88
-128	14	25	43	12	21	1.01
-129	11	20	34	8	18	0.53
-130	7	16	21	9	20	
-131	17	30	57	11	15	
-132	6	13	40	5	12	
-133	6	12	32	8	17	
-134	11	24	47	9	17	0.78
-135	5	18	33	14	22	1.19
-136	7	18	30	12	18	0.56
-137	11	20	35	8	16	
-138	4	10	16	13	21	
-139	19	37	52	7	15	
-140	5	20	35	8	20	
-141	6	17	27	10	16	
-142	6	11	19	8	20	
-143	6	14	42	8	13	
-144	7	15	26	8	21	
-145	5	14	34	10	14	
-146	7	21	42	10	14	
-147	4	12	26	6	15	
-148	4	7	9	9	20	
-149	6	16	34	8	12	
-150	4	7	11	7	15	
-151	5	13	26	8	17	
-152	3	8	9	6	15	
-153	4	7	10	7	13	
-154	4	12	26	11	19	
-155	8	19	32	9	14	
-156	6	7	16	9	13	
-157	5	7	10	9	15	
-158	4	7	8	14	23	
-159	10	17	16	12	20	0.82
-160	11	22	42	12	16	0.70
-161	5	14	28	10	23	
-162	5	15	17	11	20	0.96
-163	6	16	18	13	22	0.75
-164	2	5	11	9	15	
-165	6	12	28	11	20	

Table 6. Number of plants, length longest leaf and percent fiber of 8- triforolata seedlings. (Seed were planted in greenhouse March 1953, seedlings transplanted to Fort Lauderdale August 1953. Sanovia Experiment 51-183)

Seedling Number	Number of Plants 9/14/53	11/21/53	12/9/53	Leaf length, in. 9/16/52	12/8/52	% Fiber 8/28/53
Var. 850-124	9	13	28	11	24	
-125	8	16	39	9	22	
-126	7	20	35	10	24	
-127	11	22	45	12	20	0.98
-128	14	25	43	12	21	1.01
-129	11	20	34	8	18	0.92
-130	7	16	21	9	20	
-131	17	30	57	11	19	
-132	8	13	40	5	12	
-133	6	12	32	8	17	
-134	11	24	47	9	17	0.78
-135	5	18	39	14	22	1.19
-136	7	18	30	12	18	0.96
-137	14	20	39	8	16	
-138	4	10	16	19	21	
-139	19	37	52	7	15	
-140	5	20	35	8	20	
-141	6	17	27	10	16	
-142	6	11	19	8	20	
-143	6	14	23	8	13	
-144	7	15	26	8	21	
-145	5	14	34	10	14	
-146	7	22	42	10	14	
-147	4	12	26	6	15	
-148	4	7	9	9	20	
-149	6	16	34	8	12	
-150	4	7	11	7	15	
-151	5	13	26	8	17	
-152	3	6	9	6	15	
-153	4	7	10	7	13	
-154	4	12	26	11	19	
-155	6	19	32	9	14	
-156	6	7	16	9	13	
-157	5	7	10	9	15	
-158	4	7	8	14	23	
-159	10	17	16	12	20	0.82
-160	11	22	42	12	16	0.70
-161	5	14	24	10	23	
-162	5	15	17	11	20	0.96
-163	6	16	18	15	22	0.75
-164	2	5	11	9	15	
-165	6	12	26	11	20	

Table 6. (Cont.)

Seedling Number	Number of Plants 9/16/52	4/21/53	12/8/53	Leaf Length, in. 9/16/52	12/8/53	% Fiber 8/12/53
tri S50-166	3	6	8	10	14	
-167	4	4	5	6	13	
-168	11	23	33	6	13	
-169	5	13	20	8	17	
-170	5	9	15	9	13	
-171	3	6	12	9	18	
-172	12	25	43	8	12	
-173	8	20	34	13	24	0.96
-174	6	17	22	12	18	
-175	5	15	33	17	22	1.04
-176	3	7	13	6	16	
-177	4	12	21	10	19	
-178	6	11	12	10	23	
-179	2	4	7	7	11	
-180	4	8	20	8	10	
-181	4	9	14	8	14	
-182	3	8	8	6	10	
-183	1	4	5	8	13	

Table 5. (Cont.)

Seedling Number	Number of Plants 9/16/52	4/21/53	12/8/53	Leaf Length, in. 9/16/52	12/8/53	9/2/53	Fiber
W-1 850-166	3	6	8		10	14	
-167	4	4	5		6	13	
-168	11	23	32		6	13	
-169	5	13	20		8	13	
-170	5	9	14		9	13	
-171	3	6	12		9	12	
-172	12	25	43		8	12	
-173	8	20	34		13	24	0.96
-174	6	17	22		12	18	
-175	5	15	35		17	29	1.04
-176	3	7	13		6	16	
-177	4	12	21		10	19	
-178	6	11	12		10	23	
-179	2	4	7		7	11	
-180	4	8	20		8	10	
-181	4	9	14		8	14	
-182	3	8	8		6	10	
-183	1	4	5		8	13	

Table 7 . Number of plants, length longest leaf and percent fiber of S. trifasciata seedlings. (Seed were planted in greenhouse March 1950, seedlings transplanted to Fort Lauderdale February 1952. Sansevieria Experiment 52-5)

Seedling Number	Number of Plants			Leaf Length, in.		% Fiber
	9/16/52	4/21/53	12/8/53	9/16/52	12/8/53	8/12/53
tri S50-184	4	6	14	8	25	
-185	1	2	6	6	15	
-186	3	11	13	9	18	1.10
-187	8	15	27	9	15	
-188	8	16	36	8	12	
-189	1	5	11	6	13	
-190	2	3	5	5	9	
-191	6	11	19	12	16	0.85
-192	3	10	10	11	27	0.92
-193	4	7	8	9	13	
-194	5	13	36	9	14	
-195	2	7	8	8	9	
-196	5	7	18	8	17	
-197	6	8	22	9	23	
-198	5	12	23	9	17	
-199	2	5	8	8	12	
-200	3	6	17	8	22	
-201	4	10	17	6	14	
-202	4	8	18	8	21	
-203	4	9	12	8	23	
-204	2	4	5	8	20	
-205	3	5	12	6	23	
-206	4	5	12	9	21	0.66
-207	3	9	8	7	8	
-208	4	10	16	9	18	
-209	2	4	11	6	18	
-210	6	12	22	6	14	
-211	2	7	14	11	15	
-212	5	13	17	9	16	
-213	5	10	19	8	15	
-214	4	6	12	8	14	
-215	2	2	3	6	18	
-216	4	10	28	8	16	
-217	5	13	18	12	24	0.87
-218	2	5	5	8	9	
-219	5	12	30	10	16	0.67
-220	5	13	22	12	21	0.83
-221	4	9	16	9	21	
-222	5	12	9	8	16	
-223	3	5	7	8	15	
-224	3	6	9	10	17	
-225	2	8	13	9	11	

Table 7 . Number of plants, length longest leaf and percent fiber of *S. triasculata* seedlings. (Seed were planted in greenhouse March 1950, seedlings transplanted to Fort Lauderdale February 1952. Measurements [illegible] present 52-5)

Seedling Number	Number of Plants 9/28/52	4/21/53	12/8/53	Leaf Length, in. 9/10/52	12/8/53	% Fiber 8/12/53
tri 850-184	4	6	14	8	26	
-185	1	2	6	6	15	
-186	3	11	13	9	18	1.10
-187	8	19	27	9	15	
-188	8	16	36	8	12	
-189	1	5	11	6	13	
-190	2	3	8	5	9	
-191	6	11	19	12	16	0.85
-192	3	10	10	11	27	0.92
-193	4	7	8	9	13	
-194	8	15	36	9	14	
-195	2	7	8	8	9	
-196	5	7	18	8	17	
-197	6	8	28	9	29	
-198	5	12	23	9	17	
-199	2	5	8	8	12	
-200	3	6	17	8	22	
-201	4	10	17	6	14	
-202	4	8	18	8	21	
-203	4	9	18	8	23	
-204	2	4	5	8	20	
-205	3	8	12	6	23	
-206	4	9	12	9	21	0.96
-207	3	9	8	7	8	
-208	4	10	16	9	18	
-209	2	4	11	6	18	
-210	6	12	22	6	14	
-211	2	7	14	11	15	
-212	5	13	17	9	15	
-213	5	10	16	8	15	
-214	4	6	12	8	14	
-215	2	2	3	6	16	
-216	4	10	20	8	16	
-217	5	13	18	12	24	0.89
-218	2	5	5	8	9	
-219	5	12	30	10	16	0.87
-220	5	13	22	12	21	0.83
-221	4	9	16	9	21	
-222	5	12	9	8	16	
-223	3	5	7	8	15	
-224	3	6	9	10	17	
-225	2	8	13	9	11	

Table 7. (Cont.)

Seedling Number	Number of Plants 9/16/52	4/21/53	12/8/53	Leaf Length, in. 9/16/52	12/8/53	% Fiber 8/12/53
tri S50-226	5	12	25	10	22	
-227	3	4	9	8	13	
-228	2	4	6	8	15	
-229	1	3	4	8	17	
-230	3	4	16	7	16	
-231	4	11	17	9	24	0.61
-232	1	1	6	8	14	
-233	4	7	17	7	11	
-234	4	9	17	7	17	
-235	2	2	2	4	10	
-236	2	5	11	11	26	1.13
-237	3	10	21	8	13	
-238	5	12	19	10	19	0.98
-239	3	8	9	6	10	
-240	3	6	8	7	12	
-241	2	10	14	8	17	
-242	4	5	11	9	16	
-243	3	9	14	9	19	

Table 7. (Cont.)

Seedling Number	Number of Plants 9/16/52	4/21/53	12/8/53	Leaf length, in. 9/16/52	12/8/53	3 Fiber 9/29/53
Ark 230-236	5	12	25	10	22	
-237	3	4	9	8	13	
-238	2	4	6	8	15	
-239	1	3	4	8	17	
-240	3	4	15	7	16	
-241	4	11	17	9	24	0.61
-242	4	1	5	8	14	
-243	4	7	17	7	11	
-244	4	9	17	7	17	
-245	2	2	8	4	10	
-246	2	5	11	11	25	1.13
-247	3	16	21	8	19	
-248	3	12	19	10	19	0.98
-249	3	8	9	6	10	
-250	3	6	8	7	13	
-251	2	10	14	8	17	
-252	4	5	11	9	16	
-253	3	9	14	9	19	

Figure 2. Variation in vigor of S. trifasciata seedling clones at Fort Lauderdale. Photographs by J. Frank Joyner. December 1953.

A- tri S49-1, B- tri S49-13. Seed planted 1949, seedlings transplanted to Fort Lauderdale March 1951. The growth characteristics of these two clones are considered good from the standpoint of fiber type, and clones such as these merit further study to determine cold tolerance, percent fiber and disease resistance.
C- tri S50-117. Seed planted March 1950, seedling transferred to Fort Lauderdale May 1951. Note large number of plants, but the short undesirable length of leaves.
D - tri S49-38. Seed planted 1949, seedling transplanted to Fort Lauderdale March 1951. Note poor vigor of clone. Clones such as these do not merit further consideration in the breeding program, and a number of them are being discarded.

Figure 2. Variation in vigor of B. trifasciata seedling clones at Fort Lauderdale. Photographs by J. Frank Joyner, December 1953.

A- tri 849-1, B- tri 849-13. Seed planted 1949, seedlings transplanted to Fort Lauderdale March 1951. The growth characteristics of these two clones are considered good from the standpoint of fiber type, and clones such as these merit further study to determine cold tolerance, percent fiber and disease resistance.
C- tri 850-117. Seed planted March 1950, seedling transferred to Fort Lauderdale May 1951. Note large number of plants, but the short undesirable length of leaves.
D - tri 849-35. Seed planted 1949, seedling transplanted to Fort Lauderdale March 1951. Note poor vigor of clone. Clones such as these do not merit further consideration in the breeding program, and a number of them are being discarded.

3
2
A
3
2
1
B
2
C
2
1
D

INTERSPECIFIC AND INTERVARIETAL HYBRIDIZATION IN SANSEVIERIA

All crosses made in sansevieria from the initiation of the breeding program through October 1, 1952 were listed in the 1952 annual report. One hundred and eighty-six hybrid seedlings were obtained during 1951. These consisted of 2 hybrids of trifasciata x liberica, 6 of trifasciata x deserti, 7 of trifasciata x parva and 171 of trifasciata x laurentii. In 1952 one hundred and seventy-three hybrid seedlings were obtained. These consisted of 143 hybrids of trifasciata x laurentii, 23 of trifasciata x deserti, 6 of laurentii x parva and 1 of parva x deserti. In addition 1 seed of trifasciata x subspicata, 1 seed of laurentii x subspicata and 6 seed of trifasciata x intermedia were obtained. However, none of the seed of these last three crosses germinated.

In 1953 crossing was continued and the results of crosses made during the year are given in table 8. An effort was made to obtain more hybrids of trifasciata and liberica. However, seed set in this cross was again very low, and the three seed obtained did not germinate. When liberica was used as the female parent no seed were set. No seed were obtained in the cross of laurentii and liberica.

No seed were obtained in crosses of PI 183581 with trifasciata. PI 183581 sets seed readily in the field, and since it is a coriaceous leaf type similar to liberica, an attempt was made to hybridize it with trifasciata. No hybrids were obtained in crosses of longiflora with guineensis and subspicata.

INTERSPECIFIC AND INTERVARIETAL HYBRIDIZATION IN SANSEVIERIA

All crosses made in sansevieria from the initiation of the breeding program through October 1, 1952 were listed in the 1952 annual report. One hundred and eighty-six hybrid seedlings were obtained during 1951. These consisted of 2 hybrids of *trifasciata* x *liberica*, 6 of *trifasciata* x *deserti*, 7 of *trifasciata* x *parva* and 171 of *trifasciata* x *laurentii*. In 1952 one hundred and seventy-three hybrid seedlings were obtained. These consisted of 143 hybrids of *trifasciata* x *laurentii*, 23 of *trifasciata* x *deserti*, 6 of *laurentii* x *parva* and 1 of *parva* x *deserti*. In addition 1 seed of *trifasciata* x *suffruticosa*, 1 seed of *laurentii* x *suffruticosa* and 6 seed of *trifasciata* x *intermedia* were obtained. However, none of the seed of these last three crosses germinated.

In 1953 crossing was continued and the results of crosses made during the year are given in table 6. An effort was made to obtain more hybrids of *trifasciata* and *liberica*. However, seed set in this cross was again very low, and the three seed obtained did not germinate. When *liberica* was used as the female parent no seed were set. No seed were obtained in the cross of *laurentii* and *liberica*.

No seed were obtained in crosses of PI 189961 with *trifasciata*. PI 189961 sets seed readily in the field, and since it is a cordate cocus leaf type similar to *liberica*, an attempt was made to hybridize it with *trifasciata*. No hybrids were obtained in crosses of *longiflora* with *spinosella* and *suffruticosa*.

Table 8. Results of sansevieria crosses made in 1953.

Cross	No. Flowers Pollinated	No. Fruit Set	No. Seed Set
S. trifasciata x S. liberica	579	7	3
S. liberica x S. trifasciata	165	0	0
S. laurentii x S. liberica	161	0	0
PI 183581 x S. trifasciata	198	0	0
S. longiflora x S. guineensis	176	0	0
S. subspicata x S. longiflora	71	0	0

Table 8. Results of backcross made in 1929.

Cross	No. flowers pollinated	No. fruits set	No. seed set
B. trifasciata x B. liliputiana	379	7	3
B. liliputiana x B. trifasciata	165	0	0
B. laurentii x B. liliputiana	161	0	0
PI 18355[illegible] x B. trifasciata	198	0	0
B. longiflora x B. guineensis	176	0	0
B. rubrolineata x B. longiflora	71	0	0

HYBRID SEEDLING SELECTION

The 186 hybrid seedlings obtained in 1951 were transplanted to the Hays Farm in September 1952. All of the hybrids of trifasciata with liberica, parva and deserti and 15 of the trifasciata-laurentii hybrids were planted with 13 trifasciata and 5 liberica seedlings in one experiment (Sansevieria 52-13). The remaining 156 trifasciata-laurentii hybrids were planted in two other experiments (sansevieria 52-14 and -15).

During 1953, number of plants and length of longest leaf for each seedling in these three experiments were taken in June and December. In November a single three leaf sample was taken from each seedling clone for determination of percent fiber. The samples were retted and hand cleaned. Data on number of plants, length of longest leaf and percent fiber of these seedling clones are presented in tables 9 and 10. Percent fiber is given for the parental clones of S. parva and S. deserti.

The variation found in the trifasciata seedlings in sansevieria 52-13 is similar to differences observed in seedlings of this species at Fort Lauderdale. At present the percent fiber of most of these seedlings is low. The percent fiber of all the liberica seedlings is considerably higher. Though only five liberica seedlings were planted, there is some variation in number of plants, leaf length and percent fiber. The difficulty of propagation from leaf cuttings and shortness of leaf are the main disadvantages in the growth of liberica for fiber. The variation found here in the liberica seedlings suggests that selection for a longer leaf type would be effective. It is not

HYBRID SEEDLING SELECTION

The 186 hybrid seedlings obtained in 1951 were transplanted to the Keys Farm in September 1952. All of the hybrids of *trifasciata* with *Libertiae*, *perrsa* and *deserti* and 15 of the *trifasciata-laurentii* hybrids were planted with 13 *trifasciata* and 5 *Libertiae* seedlings in one experiment (Succulenta 52-13). The remaining 156 *trifasciata-laurentii* hybrids were planted in two other experiments (succulenta 52-14 and -15).

During 1953, number of plants and length of longest leaf for each seedling in these three experiments were taken in June and December. In November a single three leaf sample was taken from each seedling clone for determination of percent fiber. The samples were rotted and hand cleaned. Data on number of plants, length of longest leaf and percent fiber of these seedling clones are presented in tables 9 and 10. Percent fiber is given for the parental clones of *S. perrsa* and *S. deserti*.

The variation found in the *trifasciata* seedlings in succulenta 52-13 is similar to differences observed in seedlings of this species at Fort Lauderdale. At present the percent fiber of most of these seedlings is low. The percent fiber of all the *Libertiae* seedlings is considerably higher. Though only five *Libertiae* seedlings were planted, there is some variation in number of plants, leaf length and percent fiber. The difficulty of propagation from leaf cuttings and shortness of leaf are the main disadvantages in the growth of *Libertiae* for fiber. The variation found here in the *Libertiae* seedlings suggests that selection for a longer leaf type would be effective. It is not

known at present if there are differences in these liberica seedlings in ease of propagation from leaf cuttings. The short leaf, high fiber seedlings will probably be more difficult to propagate, and it is doubtful if an easy propagating, very high fiber type could be selected. However, consideration should be given to the planting and observation of more liberica seedlings.

The two trifasciata-liberica hybrids have produced a good number of plants and are similar to trifasciata in this character. H51-1 has a slightly longer leaf and higher percent fiber than H51-2.

The trifasciata-parva hybrids are superior to the other seedling groups in number of plants, but the leaves are short and narrow. In spite of the short narrow leaves, the percent fiber of some of these hybrids is surprisingly high. It does not appear that these hybrids are of any value for fiber.

The trifasciata-deserti hybrids excel in leaf length. In June 1952, the mean length of longest leaf of these six hybrids was 4.6 in.; in June 1953, 37.0 in.; in December 1953, 42.0 in. There is some variation among these six hybrids in leaf length, H51-13, 14 and 15 having the longest leaves.

The trifasciata-deserti hybrids have not produced very many plants and are similar to deserti in this character. The percent fiber varies among these hybrids. Some of them are equal to or perhaps superior to trifasciata in percent fiber.

The outstanding feature of the trifasciata-deserti hybrids is the production of the long leaves in such a short time in the absence of any crowding and shading. The petiolate leaf types such as trifasciata, which is a rain forest species, require shade before much length is attained. In plantings of these species in full sunlight,

known at present if there are differences in these Liberian seedlings in case of propagation from leaf cuttings. The short leaf, high fiber seedlings will probably be more difficult to propagate, and it is doubtful if an easy propagating, very high fiber type could be selected. However, consideration should be given to the planting and observation of more Liberian seedlings.

The two trifoveolata-Liberian hybrids have produced a good number of plants and are similar to trifoveolata in this character. M31-1 has a slightly longer leaf and higher percent fiber than M31-2.

The trifoveolata-perrieri hybrids are superior to the other seedling groups in number of plants, but the leaves are short and narrow. In spite of the short narrow leaves, the percent fiber of some of these hybrids is surprisingly high. It does not appear that these hybrids are of any value for fiber.

The trifoveolata-deserti hybrids excel in leaf length. In June 1952, the mean length of longest leaf of these six hybrids was 4.8 in.; in June 1953, 37.0 in.; in December 1953, 42.0 in. There is some variation among these six hybrids in leaf length, M31-15, 14 and 15 having the longest leaves.

The trifoveolata-deserti hybrids have not produced very many plants and are similar to deserti in this character. The percent fiber varies among these hybrids. None of them are equal to or perhaps superior to trifoveolata in percent fiber.

The outstanding feature of the trifoveolata-deserti hybrids is the production of the long leaves in such a short time in the absence of any crowding and shading. The petiolate leaf types such as trifoveolata, which is a rain forest species, require shade before such length is attained. In plantings of these species in full sunlight,

fiber length leaves are not produced until there is sufficient crowding of plants to give shading of the petioles. The other parent species, deserti, is a desert type and apparently insensitive to sunlight. But leaf length in this species in Florida rarely exceeds 2 feet. Apparently in the hybrids, the potentiality for a long leaf has been inherited from trifasciata while the insensitivity to sunlight has come from deserti. The combination of these two characters must account for the extreme vigor of these hybrids.

The trifasciata-laurentii hybrids are in many ways similar to the group of trifasciata seedlings at Fort Lauderdale. They vary in color and variegation pattern, general vigor, number of plants, leaf length and percent fiber.

In October 1953, sufficient leaf material was cut from the two trifasciata-liberica hybrids, two of the trifasciata-parva and the six trifasciata-deserti hybrids to plant a 6 x 9 foot plot in one of the nursery observation trials at the Hays Farm. Next spring these and certain of the best trifasciata-laurentii hybrids will be planted at Belle Glade in cold tolerance tests.

The trifasciata-deserti, laurentii-parva and parva-deserti hybrids obtained in 1952 were transplanted to the Hays Farm in October 1953. The trifasciata-laurentii hybrids obtained in 1952 will be transplanted to the field at Belle Glade as soon as danger of serious frost damage is past.

All six of the trifasciata-deserti hybrids obtained in 1951 are now flowering. The backcross to trifasciata has been made and fruit have set in this backcross. Fruit are also developing after self-

pollination of the hybrids. If F_2 and backcross to trifasciata plants are obtained, there should be wide variation among seedlings in number of plants or stooling. A good stooling seedling with at least the vigor of the F_1 will be the objective of selection in the backcross and F_2 population.

The planting stock of the trifasciata-deserti hybrids should be increased as much as possible for more extensive studies. The growth of the six hybrids since transplanting suggests the possibility of the use of the more vigorous ones for annual harvest of fiber. This possibility should be investigated, especially on the peat soils.

The variation among the trifasciata-deserti hybrids indicates that attempts should be made to obtain more of these hybrids. The two 6 x 9 foot plots of deserti at the Hays Farm should provide sufficient flowers to allow for more trifasciata-deserti crossing in 1954.

The vigor of the trifasciata-deserti hybrids indicates the advisability of making crosses of trifasciata with other desert species. Several species similar to deserti are being established at the Hays Farm and should produce flowers in the near future. Also, a special effort should be made to obtain a more complete collection of sansevieria species, particularly the African desert types.

S. ehrenbergii , similar to deserti except for a broader deeper interfacial leaf channel, flowered in September 1953, but there were no flowers in trifasciata at that time. The inability to make this cross indicates the need for reliable studies on the phytoperiodic response of sansevieria species.

pollination of the hybrids. If F_2 and backcrosses to *trifasciata* plants are obtained, there should be wide variation among seedlings in number of plants or shooting. A good shooting seedling with at least the vigor of the F_1 will be the objective of selection in the backcross and F_2 population.

The planting stock of the *trifasciata-deserti* hybrids should be increased as much as possible for more extensive studies. The growth of the six hybrids since transplanting suggests the possibility of the use of the more vigorous ones for annual harvest of fiber. This possibility should be investigated, especially on the peat soils.

The variation among the *trifasciata-deserti* hybrids indicates that attempts should be made to obtain more of these hybrids. The two 6 x 9 foot plots of *deserti* at the Dye Farm should provide sufficient flowers to allow for more *trifasciata-deserti* crossing in 1934.

The vigor of the *trifasciata-deserti* hybrids indicates the advisability of making crosses of *trifasciata* with other desert species. Several species similar to *deserti* are being established at the Dye Farm and should produce flowers in the near future. Also, a special effort should be made to obtain a more complete collection of sansevieria species, particularly the African desert types.

S. aloysiorum, similar to *deserti* except for a broader deeper interfacial leaf channel, flowered in September 1933, but there were no flowers in *trifasciata* at that time. The inability to make this cross indicates the need for reliable studies on the photoperiodic response of sansevieria species.

Table 9 . Number of plants, length of longest leaf and percent fiber of sansevieria hybrids and parents. (Seed planted in greenhouse July 1951, seedlings transplanted to Hays Farm September 1952. Experiment Sansevieria 52-13)

Seedling Number	Number of Plants 6/25/53	12/7/53	Length Longest Leaf, in. 6/25/53	12/7/53	% Fiber 11/10/53
S. trifasciata:					
tri S52-1	4	5	6	6	0.90
-2	11	24	12	14	0.65
-3	1	4	14	15	0.64
-4	4	10	14	14	0.42
-5	2	6	10	13	0.85
-6	7	11	13	16	0.76
-7	3	12	12	15	0.83
-8	7	14	21	25	1.01
-9	3	3	14	16	0.56
-10	9	15	21	27	1.18
-11	4	8	16	17	0.69
-12	4	10	11	15	0.80
-13	2	2	7	8	0.45
S. liberica:					
lib S50-1	3	3	14	15	1.75
-2	2	2	29	30	1.75
-3	3	3	15	16	2.27
-4	1	3	20	21	1.36
-5	5	11	19	19	1.55
S. parva					1.48
S. deserti					1.72
S. trifasciata x S. liberica:					
H51 -1	6	21	24	28	1.65
-2	10	23	18	23	1.09
S. trifasciata x S. parva					
H51 -3	16	28	23	23	1.40
-4	11	24	18	18	1.10
-5	20	41	17	20	1.12
-6	13	31	21	24	1.70
-7	12	29	18	18	0.99
-8	13	22	20	21	1.23
-9	17	34	19	19	1.08
S. trifasciata x S. deserti					
H51-10	4	10	36	47	0.99
-11	4	4	36	37	1.50
-12	7	7	38	43	1.73
-13	9	10	53	61	1.29
-14	3	3	53	54	1.44

Table 7 . Number of plants, length of longest leaf and percent fiber of successive hybrids and parents. (Seed planted in greenhouse July 1951, seedlings transplanted to Hays Farm September 1952. Experiment Season-wide 52-53)

Seedling Number	Number of Plants 6/20/52	12/7/52	Length Longest Leaf, in. 6/25/53	12/7/53	% Fiber 11/10/53
B. bufloensis:					
Buf 852-1	4	5	6	6	0.90
-2	11	24	12	14	0.69
-3	1	4	14	15	0.64
-4	4	10	14	14	0.42
-5	2	6	10	13	0.85
-6	7	11	13	16	0.76
-7	3	12	12	15	0.89
-8	7	14	21	25	1.01
-9	1	5	14	16	0.96
-10	9	19	21	27	1.18
-11	4	8	16	17	0.89
-12	1	10	12	15	0.80
-13	2	2	7	8	0.45
B. liberiae:					
Lib 850-1	3	3	14	15	1.75
-2	2	2	29	30	1.75
-3	3	3	15	16	2.27
-4	1	3	20	21	1.36
-5	5	11	19	19	1.95
B. perva					1.48
B. decorti					1.72
B. bufloensis					
x B. liberiae:					
Bfl -1	6	21	24	28	1.65
-2	10	23	18	23	1.09
B. bufloensis					
x B. perva					
Bfl -3	16	28	23	23	1.40
-4	11	24	18	18	1.10
-5	20	41	17	20	1.12
-6	15	31	21	24	1.70
-7	12	29	15	18	0.99
-8	13	24	20	21	1.23
-9	17	34	19	19	1.08
B. bufloensis					
x B. decorti					
Bfl-10	4	10	34	47	0.99
-11	4	8	34	37	1.30
-12	7	7	34	43	1.73
-13	9	10	33	41	1.29
-14	3	3	33	34	1.44

Table 9 . (Cont.)

Seedling Number	Number of Plants 6/25/53	12/7/53	Length Longest Leaf, in. 6/25/53	12/7/53	% Fiber 11/10/53
S. trifasciata x *S. deserti*					
H51-15	3	4	42	53	1.73
S. trifasciata x *S. laurentii*					
H51-16	8	18	14	15	0.86
-17	14	26	20	20	0.79
-18	13	28	21	24	0.77
-19	8	29	20	20	1.11
-20	16	34	24	25	0.55
-21	12	22	18	18	0.69
-22	14	26	21	19	1.08
-23	6	19	17	17	0.68
-24	7	16	20	20	0.60
-25	7	21	21	22	0.93
-26	14	24	15	16	0.83
-27	11	27	19	20	0.81
-28	12	39	23	24	1.08
-29	18	19	9	18	0.79
-30	14	26	27	29	1.00

Table 7 . (Cont.)

Seedling Number	Number of Plants 6/25/53	12/7/53	Length Longest Leaf, in. 6/25/53	12/7/53	% Fiber 11/10/53
S. trifoveolata x S. decorti					
W51-15	3	4	12	53	1.73
S. trifoveolata x S. laurentii					
W51-16	8	16	14	15	0.86
-17	14	26	20	20	0.79
-18	13	28	21	24	0.77
-19	8	29	20	20	1.11
-20	16	34	24	26	0.55
-21	12	20	15	18	0.69
-22	14	26	21	19	1.06
-23	8	19	17	17	0.68
-24	7	16	20	20	0.66
-25	7	21	21	22	0.93
-26	14	24	15	16	0.85
-27	11	27	19	20	0.81
-28	12	39	23	24	1.06
-29	16	19	9	18	0.79
-30	14	26	27	29	1.09

Table 10. Number of plants, length longest leaf and percent fiber of sansevieria hybrid seedlings. (Seed were planted in July 1951, seedlings were transplanted to the Hays Farm September 1952. Sansevieria Experiments 52-14 and 52-15.)

Seedling Number	Number of Plants 6/25/53	12/7/53	Leaf Length, in. 6/25/53	12/7/53	% Fiber 11/10/53
trifasciata x laurentii:					
H51-31	11	26	19	20	.95
-32	13	33	27	29	.77
-33	5	15	25	26	.84
-34	11	21	26	29	1.01
-35	6	11	25	26	.74
-36	5	7	19	22	.83
-37	8	19	19	21	.83
-38	7	17	20	25	1.11
-39	5	14	21	22	.59
-40	3	6	14	19	.40
-41	4	8	16	17	.50
-42	1	6	15	15	.80
-43	10	23	21	21	.34
-44	6	15	16	16	.65
-45	6	16	23	24	.62
-46	6	10	20	22	.65
-47	4	9	15	19	1.12
-48	7	9	20	21	.78
-49	8	19	18	23	.94
-50	6	15	17	17	.46
-51	8	15	25	27	.68
-52	7	15	21	24	1.14
-53	5	12	18	19	.43
-54	10	24	23	28	.42
-55	5	8	14	14	1.04
-56	4	14	22	23	1.07
-57	5	15	18	19	.65
-58	10	14	20	23	1.04
-59	6	12	20	21	.62
-60	10	19	21	22	1.03
-61	7	16	24	25	1.19
-62	4	8	19	22	1.09
-63	1	4	14	14	.72
-64	4	6	14	16	1.01
-65	6	16	19	20	.68
-66	2	6	12	16	1.35
-67	7	14	18	19	.79
-68	4	8	23	25	.69
-69	7	9	21	22	.55
-70	7	20	16	18	.74
-71	1	2	10	16	.83
-72	3	8	9	15	1.21
-73	7	12	18	19	.64
-74	4	12	19	20	1.06

Table 10. Number of plants, length longest leaf and percent fiber of sansevieria hybrid seedlings. (Seed were planted in July 1951, seedlings were transplanted to the Hays Farm September 1952. Measurements 52-14 and 52-15.)

Seedling Number	Number of Plants 6/25/53	12/7/53	Leaf Length, In. 6/25/53	12/7/53	% Fiber 11/10/53
hrilasolata x laurentii:					
H51-31	11	26	19	20	.95
-32	13	23	27	29	.77
-33	5	15	25	26	.84
-34	11	21	26	29	1.01
-35	6	11	25	26	.74
-36	5	7	19	22	.63
-37	8	19	19	21	.69
-38	7	17	20	25	1.11
-39	5	14	21	22	.59
-40	3	6	14	19	.40
-41	4	8	16	17	.30
-42	1	6	15	15	.80
-43	10	23	21	21	.34
-44	6	15	16	16	.65
-45	6	16	23	24	.68
-46	6	10	20	22	.65
-47	4	9	15	19	1.12
-48	7	9	20	21	.75
-49	8	19	18	23	.94
-50	6	15	17	17	.46
-51	8	15	25	27	.68
-52	7	15	21	24	1.14
-53	5	12	18	19	.43
-54	10	24	23	28	.42
-55	5	8	14	14	1.04
-56	4	14	22	23	1.07
-57	5	15	18	19	.65
-58	10	14	20	23	1.04
-59	6	12	20	21	.62
-60	10	19	21	22	1.09
-61	7	16	24	25	1.19
-62	4	8	19	22	1.09
-63	1	4	14	14	.72
-64	4	6	14	16	1.01
-65	6	16	19	20	.68
-66	2	6	12	16	1.35
-67	7	14	18	19	.79
-68	4	8	23	25	.69
-69	7	9	21	22	.55
-70	7	20	16	18	.74
-71	1	2	10	16	.83
-72	3	8	9	15	1.21
-73	7	12	18	19	.64
-74	4	12	19	20	1.06

H51-75	6	12	22	22	1.24
-76	5	16	17	18	.58
-77	6	14	15	16	.91
-78	9	21	17	19	.61
-79	3	7	17	19	.92
-80	9	20	23	25	.82
-81	1	3	8	13	.63
-82	4	8	21	23	.94
-83	7	22	21	21	.75
-84	6	11	19	22	1.28
-85	10	26	19	22	.94
-86	2	6	9	15	.86
-87	7	12	9	9	.99
-88	5	14	19	22	.94
-89	7	16	18	23	.75
-90	6	12	14	14	.52
-91	14	22	20	20	.46
-92	9	21	19	19	.73
-93	16	36	16	16	.70
-94	5	10	24	25	.77
-95	5	8	16	16	.80
-96	5	10	16	16	.77
-97	5	13	18	20	.64
-98	4	7	18	19	.84
-99	10	22	17	19	.68
-100	7	21	24	25	1.04
-101	6	19	15	15	.50
-102	6	17	21	21	.59
-103	6	16	13	13	1.58
-104	4	12	21	23	.24
-105	4	11	17	19	.75
-106	5	16	7	10	.73
-107	8	17	20	20	.31
-108	11	19	25	26	.65
-109	9	22	16	20	.63
-110	3	10	19	19	.64
-111	7	9	25	27	.86
-112	8	17	22	25	1.02
-113	7	11	15	15	1.12
-114	9	24	21	23	1.25
-115	5	14	24	25	1.25
-116	7	14	19	20	.98
-117	3	8	12	17	.63
-118	7	18	17	18	1.12
-119	10	22	19	20	.93
-120	10	23	22	23	.77
-121	9	20	20	19	.76
-122	7	13	14	14	.67
-123	11	25	21	22	.52
-124	7	16	19	21	.44
-125	11	26	20	23	.88
-126	4	10	5	10	1.23
-127	8	18	21	23	.29
-128	13	36	19	19	.64

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-129	8	24	16	16	.86
-130	3	9	10	15	.92
-131	10	21	20	20	1.28
-132	8	14	26	27	.58
-133	6	10	17	18	.60
-134	7	22	18	18	.80
-135	8	14	16	17	.98
-136	6	14	21	25	.55
-137	8	16	19	19	.41
-138	7	17	24	26	.81
-139	5	13	18	18	.74
-140	11	25	16	16	.86
-141	5	12	22	26	.51
-142	3	4	15	17	.54
-143	10	23	23	28	1.26
-144	7	15	20	22	.68
-145	9	17	16	17	1.17
-146	5	14	5	9	.85
-147	6	14	22	23	.81
-148	6	13	18	23	.81
-149	10	17	14	16	.66
-150	7	9	21	23	.88
-151	14	34	23	25	1.09
-152	5	13	24	24	1.03
-153	5	10	15	16	1.05
-154	6	14	18	19	.69
-155	10	16	22	22	1.02
-156	9	15	16	19	1.08
-157	6	15	18	19	.99
-158	9	22	18	18	.67
-159	5	13	19	20	.48
-160	8	16	19	19	.62
-161	6	10	22	24	1.17
-162	13	23	17	19	.93
-163	6	14	17	18	.39
-164	14	30	21	22	.48
-165	9	15	20	21	.58
-166	1	3	7	11	.95
-167	6	17	18	18	1.17
-168	8	17	19	19	1.21
-169	7	16	19	20	.98
-170	12	23	21	21	.76
-171	10	21	14	16	.84
-172	5	10	19	19	.37
-173	4	13	13	14	.80
-174	12	24	23	25	.85
-175	13	32	18	19	.64
-176	12	21	21	22	.77
-177	3	8	14	14	.77
-178	5	13	14	15	.86
-179	7	20	14	14	1.11
-180	6	13	20	20	1.12
-181	6	19	20	24	.49
-182	7	12	16	16	.23
-183	3	7	16	16	.90
-184	6	10	16	22	1.26

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-185	4	13	10	17	.52
-186	7	20	12	19	.78

-185	4	13	10	17	:32
-186	7	20	12	19	:78

Figure 3. Sansevieria hybrids. Photographs August 1953 by J. Frank Joyner. Seed planted July 1951, seedlings transplanted to Hays Farm September 1952.

A - H51-14 (*trifasciata* x *deserti*). Note long leaves and small number of plants.
B - H51-5 (*trifasciata* x *parva*). Note short narrow leaves and large number of plants.
C - H51-2 (*trifasciata* x *liberica*). Note similarity to *liberica*.

Figure 3. Gaillardia hybrids. Photographed August 1953 by J. Frank Joyner. Seed planted July 1951, seedlings transplanted to May Farm September 1952.

A - M51-14 (*Gaillardia* x *decorata*). Note long leaves and small number of plants.

B - M51-5 (*Gaillardia* x *aristata*). Note short narrow leaves and large number of plants.

C - M51-2 (*Gaillardia* x *Tiburtina*). Note similarity to *Tiburtina*.

3
2
A

B

2
C

KENAF

INTRODUCTION

During the year two kenaf breeding nurseries were planted. The spring nursery consisted of 93 Salvadorian lines (12 at the S_3 generation of breeding and 81 at the S_2 level), 2 F_3 Salvadorian x Tingo Maria lines and observational rows of 13 varietal types of H. cannabinus and H. sabdariffa. The fall nursery was more extensive and consisted of 102 Salvadorian lines (12 at the S_4, 78 at the S_3 and 12 at the S_2 level of breeding), 6 Salvadorian x Tingo Maria lines (2 at the F_4 and 4 at the F_3 level), 30 F_3 Salvadorian x Javanese lines, 8 F_3 Salvadorian x Manchurian lines, F_2 populations of Salvadorian x Javanese, F_2 population of Salvadorian x Tingo Maria, F_2 population of Salvadorian x Manchurian, 20 lines introduced from Cuba, 2 introductions from Egypt, materials being used in genetic studies and several miscellaneous Hibiscus species.

The nurseries were planted on February 3 and September 4. These two dates were very satisfactory, and future nurseries should be planted near these same dates for good seed yields and a size plant which can be easily pollinated. Growth in the spring nursery was excellent, and a good supply of seed was obtained. The heavy rains during late September and October reduced the growth in the fall nursery. Despite this fact, a fair amount of seed was obtained in most of the lines.

Yield testing of lines developed at this station was initiated during the year. The parent Salvadorian variety and 48 Salvadorian lines were compared in a 7 x 7 simple lattice at Belle Glade.

REPORT

INTRODUCTION

During the year two general breeding nurseries were planted. The spring nursery consisted of 93 Salvadorian lines (12 at the S_3 generation of breeding and 81 at the S_2 level), 2 F_3 Salvadorian x Thigo Maria lines and observational rows of 13 varietal types of H. cannabinus and H. sabdariffa. The fall nursery was more extensive and consisted of 102 Salvadorian lines (12 at the S_4, 78 at the S_3 and 12 at the S_2 level of breeding), 6 Salvadorian x Thigo Maria lines (2 at the F_4 and 4 at the F_3 level), 30 F_3 Salvadorian x Javanese lines, 8 F_3 Salvadorian x Mauritian lines, F_3 populations of Salvadorian x Javanese, F_3 population of Salvadorian x Thigo Maria, F_2 population of Salvadorian x Manchurian, 20 lines introduced from Cuba, 2 introductions from Egypt, materials being used in genetic studies and several miscellaneous Hibiscus species.

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Field testing of lines developed at this station was initiated during the year. The present Salvadorian variety and 43 Salvadorian lines were compared in a 7 x 7 simple lattice at Belle Glade.

Seed increase of some of the best Salvadorian lines was begun. Ten lines were selected on the basis of yield and disease resistance and planted in isolated blocks in the Lake Worth area. Selfed seed were used in all these plantings. In addition, a 1/3 acre block of bulked open-pollinated seed of ~~five~~ four Salvadorian lines was planted at Fort Lauderdale to provide seed for engineering and agronomic plantings next summer.

Seed increase of some of the best Salvadorian lines was begun. Ten lines were selected on the basis of yield and disease resistance and planted in isolated blocks in the Lake Worth area. Bulked seed were used in all these plantings. In addition, a 1/3 acre block of bulked open-pollinated seed of five Salvadorian lines was planted at Fort Lauderdale to provide seed for engineering and agronomic plantings next summer.

POLLINATING TECHNIQUES

Self-pollination

There are two means by which self-pollination may occur in a closed kenaf flower. In some plants selfing occurs when the style elongates following anthesis and the stigmas come in contact with the anthers at the top of the fused stamen column. More commonly, though, the elongation of the style prior to anthesis has placed the stigmas above the anthers at the top of the fused stamen column, and selfing occurs by a downward curving of the style to place the stigmas in contact with the anthers. In such plants any means of keeping the flowers closed to insure self-pollination must not prevent the downward curving of the styles.

When the breeding work was begun, several means of keeping the flower closed to insure self-pollination were tested. These consisted of the use of wire (with attached tag) to wrap around the tip of the bud, a cotton string to tie to the tip of the bud, an ordinary paper clip placed on the tip of the bud and the cellulose acetate-acetone solution to seal the tip of the bud. The sealing solution appeared to be the most satisfactory and was adopted as the standard technique for self-pollination.

The sealing technique is very satisfactory for flowers in which self-pollination occurs when the style elongates following anthesis and the stigmas come in contact with the anthers. In such flowers it is not necessary to exercise extreme caution about how much of the tip of the bud is sealed. However, in flowers in which the style curves downward, the sealing technique is not as effective. Frequently

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too much of the tip of the bud is sealed, and this prevents the curving of the style. Self-pollination is thus impossible, and for this reason capsule set in some lines following sealing is sometimes as low as 60%.

In 1952 Dr. Feaster suggested the use of clip-on paper clips (fasteners) to hold the flower closed. Several hundred of these were compared with the sealing solution in the spring nursery. The clips gave a capsule set of 92% while the sealing solution gave a set of only 68%. The clip is 3/8" long and of sufficient length and strength to hold the flower closed. It is short enough to allow for the downward curving of the style and thus gives a higher capsule set. The method is as rapid as the sealing technique and eliminates the disadvantages of making up the sealing solution and the handling of the solution during pollination. These clips were used in making all the self-pollinations in the fall nursery. The buds were clipped in the afternoon, and the flowers were tagged the following morning.

Cross-pollination

Emasculations for hybridization are generally made in the late afternoon. During periods of hot weather it is necessary to emasculate earlier since anthesis may occur in the unopened bud by late afternoon. Emasculation is accomplished by removing the petals and anthers from the bud by the use of forceps. In the process of emasculation, the fused stamen filament column is left around the style for support and to prevent drying action. Soda straws are used to prevent contamination. These straws are cut 2" long; one end is closed and a piece of copper wire or string attached by stapling.

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Crosse-pollination

Emasculations for hybridization are generally made in the late afternoon. During periods of hot weather it is necessary to emasculate earlier since anthesis may occur in the unopened bud by late afternoon. Emasculation is accomplished by removing the petals and anthers from the bud by the use of forceps. In the process of emasculation, the fused stamen filament column is left around the style for support and to prevent drying action. Soda straws are used to prevent contamination. These straws are cut 2" long; one end is closed and a piece of copper wire or string attached by stapling.

The straws are placed over the stamen filament colum, style and stigmas and the string or wire tied to the plant. Buds of the male parent are clipped as in self-pollination to prevent contamination by bees before crossing. The following morning cross-pollinations are made by removing the clipped flowers of the male parent and touching the stigmas of the emasculated flowers with pollen. The straw is replaced over the stigmas and the cross-pollinated flower tagged.

A method of accomplishing the emasculation and crossing at the same time was tried in the fall nursery. After emasculation, about six anthers from the male parent were placed in the soda straw. The straw was then slipped over the stigmas and filament column so that the anthers were in contact with the stigmas. Very few capsules set seed following this method of crossing. However, these crosses were made late in the season in capsules near the top of the plant where few open-pollinated capsules set, and it appears that this may account for the low set in these crosses. This method should be given further trial as it will result in a considerable saving of time required to make cross-pollinations.

LEAF TYPE, DAYS TO FLOWER, FIBER TYPE AND UNIFORMITY OF KENAF LINES

Data on leaf type, days to flower, fiber type and uniformity of most of the kenaf lines grown in nursery plantings in 1953 are given in Table 1.

The leaf type data for the latest generation (fall nursery) are presented. The leaf type character has become stabilized in 65 of the 93 S_3 and S_4 Salvadorian lines listed. Twenty-four of these are entire while the remaining 41 are divided. It is expected that most of the 28 lines still segregating will be stable for leaf type after another generation of selection. Most of the F_3 and F_4 generation lines resulting from crosses of Salvadorian with other varieties are still segregating for leaf type.

Days to flower data are presented for both the spring and fall nursery wherever a line was planted in both nurseries. The figure given is the mean of all progenies of a particular line. There is a striking agreement between the days to flower in the two plantings with a slightly larger number of days required in the fall nursery. There is very little variation among the Salvadorian lines in days to flower, only 10 days difference in the spring nursery and 9 in the fall nursery. Selection within the Salvadorian variety has not been effective in developing lines differing greatly in maturity from the parent variety.

The F_3 and F_4 lines from Salvadorian crossed with Tingo Maria and Javanese were for the most part quite variable with regard to days to flower. Only a few of these lines were stable for days to

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The F3 and F4 lines from Salvadorian crossed with Tlingo Maran and Javanese were for the most part quite variable with regard to days to flower. Only a few of these lines were stable for days to

flower, and for most of them the range in flowering is listed. Judging from the segregation for maturity in this group, it appears that lines as much as two months later than Salvadorian can be selected.

Some of the 8 Salvadorian x Manchurian F_3 lines were considerably earlier than the Salvadorian lines. This indicates that lines earlier than Salvadorian can be extracted after crossing the day neutral Manchurian introductions with Salvadorian. These F_3 lines have not yet been grown in the long summer days to determine their photoperiod reaction. There is a possibility that a kenaf which flowers earlier than Salvadorian will mature fiber in less than 100 days and thus give a shorter smaller stalk for harvesting.

In the spring nursery, the more advanced lines were rated 1-4 for fiber type with 1 considered good and 4, poor. Such characteristics as branching, size of stalk and height were considered in this rating. The figure given in Table 1 is the mean of all progenies of a line. No line had a mean rating of 1, but several were rated 2. It could hardly be expected that good fiber plants would develop in wide-spaced nursery plantings. However, very noticeable differences in branching have been noted in such plantings, and some kind of rating for fiber type seems well worthwhile.

The more advanced lines in the spring nursery were also rated 1-4 for uniformity, with 1 considered good and 4, poor. The figure given in Table 1 is the mean of all progenies of a line. These means indicate considerable differences in the uniformity of the Salvadorian lines in this planting.

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Table 1. Leaf type, days to flower and fiber type and uniformity ratings of kenaf lines

Line	Leaf Type[1]	Days to Flower Spring[2]	Days to Flower Fall[3]	Fiber Type[4]	Uniformity[5]
Salvador lines:					
J-1	E	63	60	2	1
J-4	E	59	62	2	3
J-5	D	58	64	3	2
J-7	D	55	61	3	2
J-9	S	55	62	3	2
J-10	S	56	60	2	2
J-12	D	59	62	3	2
J-15	E	55	58	3	2
J-19	E	56	61	3	2
J-20	S	58	62	3	2
J-21	E	56	58	2	1
J-22	E	56	60	3	1
J-27	D	58	63	3	3
J-32	E	58	63	3	2
J-35	E	56	62	2	1
J-36	E	56	62	2	1
J-37	E	55	60	3	2
J-38	S	55	-	4	2
J-39	S	57	60	4	2
J-41	S	59	62	3	2
J-48	E	56	62	2	1
J-52	S	56	62	2	1
J-57	S	55	60	3	2
J-62	D	62	65	3	2
J-92	E	62	62	2	2
J-93	S	55	62	3	2
J-94	D	63	63	3	3
J-95	D	63	61	3	2
J-96	D	64	60	3	2
J-97	D	64	61	2	2
J-98	D	64	60	3	2
J-99	D	62	60	3	3
J-100	D	63	61	3	3
J-101	D	59	60	3	3
J-102	S	59	61	3	2
J-103	D	59	61	3	1
J-104	E	55	60	2	2
J-105	S	55	61	3	3
J-106	D	55	61	3	2
J-107	D	56	58	3	2
J-108	D	55	57	3	2
J-109	E	54	57	2	1
J-110	E	55	61	3	2

Table 1. Leaf type, days to flower and fiber type and uniformity
rations of lupine lines

Line	Type	Days to Flower	Fiber Type	Uniformity
Barvador				
Lines:				
1-1	E	63	60	2
1-4	S	59	62	2
1-5	D	58	64	2
1-7	D	55	61	2
1-9	S	55	62	2
1-10	S	56	60	2
1-12	D	59	62	2
1-15	S	55	58	2
1-19	E	56	64	2
1-20	S	58	62	2
1-21	E	56	59	1
1-22	S	56	60	1
1-27	D	58	65	2
1-32	E	56	63	2
1-35	I	56	62	2
1-36	E	56	62	2
1-37	A	55	60	2
1-38	D	55	64	2
1-39	S	57	60	2
1-41	S	59	62	2
1-48	E	56	62	2
1-52	S	56	62	2
1-57	S	55	60	2
1-62	D	62	65	2
1-92	E	62	62	2
1-93	S	55	62	2
1-94	D	63	63	2
1-95	D	63	61	2
1-96	D	64	60	2
1-97	D	61	61	2
1-98	D	64	60	2
1-99	D	62	60	2
1-100	D	63	61	2
1-101	D	58	60	2
1-102	D	59	61	2
1-103	D	59	61	2
1-104	E	55	60	2
1-105	E	55	61	2
1-106	D	55	61	2
1-107	D	56	59	2
1-108	D	55	57	2
1-109	E	54	57	2
1-110	E	55	62	3

J-111	E	55	59	2	2
J-112	D	55	61	3	2
J-113	S	55	59	2	2
J-114	E	55	58	3	2
J-115	E	55	59	3	2
J-116	S	56	63	3	2
J-117	E	56	65	4	4
J-118	E	56	59	3	3
J-120	E	56	61	3	3
J-121	E	57	61	3	2
J-122	S	57	59	3	2
J-123	S	58	58	2	2
J-124	S	63	59	3	3
J-143	S	64	62	3	2
J-144	S	63	62	3	2
J-145	S	61	63	3	2
J-147	S	59	59	2	2
J-148	D	56	61	3	3
J-149	D	55	61	3	2
J-150	D	55	63	3	2
J-151	D	57	63	4	3
J-152	E	57	63	2	2
J-153	D	57	62	3	2
J-154	D	56	63	3	3
J-155	S	56	62	3	3
J-157	D	56	61	3	3
J-158	D	56	65	4	2
J-159	D	56	63	4	2
J-160	S	56	66	3	2
J-161	D	56	63	3	2
J-162	D	56	62	3	2
J-163	D	55	-	3	3
J-164	D	56	64	4	3
J-165	D	55	63	3	3
J-166	S	55	60	2	3
J-167	D	55	61	3	2
J-168	D	61	62	3	2
J-170	D	58	61	3	2
J-171	S	63	60	2	2
J-172	D	60	63	3	2
J-173	D	57	60	3	2
J-174	D	60	61	3	3
J-175	S	58	65	3	3
J-176	S	56	64	4	3
J-177	D	57	63	4	2
J-179	S	56	-	3	3
J-180	D	57	64	3	3
J-184	E	55	62	2	3
J-185	S	55	61	3	2
J-186	D	55	64	3	2

1-111
1-112
1-113
1-114
1-115
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1-171
1-172
1-173
1-174
1-175
1-176
1-177
1-179
1-180
1-184
1-185
1-186

Salvador x Tingo Maria F_4 Generation:			
JI-1	E	72	81
JI-4	S	72	76
Salvador x Tingo Maria F_3 Generation:			
JI-2	E	-	79
JI-3	E	-	82
JI-5	S	-	60-99
JI-6	S	-	79
Salvador x Javanese F_3 Generation:			
JH-1	S	-	54-59
JH-2	S	-	64-82
JH-3	D	-	59
JH-4	S	-	57-95
JH-5	S	-	62
JH-6	D	-	57-84
JH-7	S	-	62-83
JH-8	S	-	58-83
JH-9	S	-	59-81
JH-10	D	-	59-63
JH-11	D	-	62-93
JH-12	D	-	94-101
JH-13	D	-	72
JH-14	D	-	72-81
JH-15	D	-	59
JH-17	D	-	79-94
JH-18	D	-	84
JH-19	S	-	57
JH-20	E	-	74-99
JH-21	D	-	59-101
JH-22	S	-	74
JH-23	E	-	63-102
JH-24	S	-	69
JH-25	D	-	57
JH-26	S	-	57-68
JH-28	S	-	68-79
JH-29	D	-	61
JH-30	D	-	59
JH-32	S	-	58
JH-33	S	-	76
Salvador x Manchurian F_3 Generation:			
JD-1	E	-	58
JD-2	E	-	56

Salvador x
Tinga Maria
F_2 Generation:

7I-1	E	72	81
7I-4	E	72	76

Salvador x
Tinga Maria
F_2 Generation:

7I-2	E	-	79
7I-3	E	-	82
7I-5	E	-	86-99
7I-6	E	-	79

Salvador x
Javanese
F_2 Generation:

7I-1	E	-	54-59
7I-2	E	-	64-82
7I-3	D	-	59
7I-4	E	-	57-95
7I-5	E	-	82
7I-6	D	-	57-84
7I-7	E	-	82-83
7I-8	E	-	58-83
7I-9	E	-	59-81
7I-10	D	-	90-83
7I-11	D	-	89-93
7I-12	D	-	94-101
7I-13	D	-	72
7I-14	D	-	72-81
7I-15	D	-	59
7I-17	D	-	79-94
7I-18	D	-	84
7I-19	E	-	57
7I-20	E	-	74-99
7I-21	D	-	99-101
7I-22	E	-	74
7I-23	E	-	83-102
7I-24	E	-	69
7I-25	D	-	57
7I-26	E	-	57-68
7I-28	E	-	69-79
7I-29	D	-	81
7I-30	D	-	79
7I-32	E	-	88
7I-33	E	-	96

Salvador x
Hawaiian
F_2 Generation:

7I-1	E	-	58
7I-2	E	-	96

JD-3	S	-	46
JD-4	E	-	58
JD-5	S	-	56
JD-6	S	-	57
JD-7	E	-	51
JD-8	E	-	51
Salvador x Javanese F_2 Generation:			
J x A	S	-	56-107
J x E	S	-	58-106
J x H	S	-	55-107
Salvador x Tingo Maria F_2 Generation:			
J x I	S	-	69-83
Salvador x Manchurian F_2 Generation:			
J x G	S	-	55-64

[1]E - Entire, D - Divided, S - Segregating

[2]Spring nursery, planted Feb. 3, 1953

[3]Fall nursery, planted Sept. 4, 1953

[4]Rated 1-4, 1 - good, 4 - poor

[5]Rated 1-4, 1 - good, 4 - poor

1D-3	S	-	46
1D-4	R	-	56
1D-5	S	-	56
1D-6	S	-	57
1D-7	S	-	51
1D-8	E	-	51

Salvador x
Javanese
F2 Generation:

1 x A	S	-	50-107
1 x E	S	-	56-106
1 x H	S	-	55-107

Salvador x
Thigo Maria
F2 Generation:

1 x I	S	-	69-63

Salvador x
Manduriam
F2 Generation:

1 x G	S	-	53-64

[1]E - Entire, D - Divided, S - Segregating

[2]Spring nursery, planted Feb. 3, 1953

[3]Fall nursery, planted Sept. 4, 1953

[4]Rated 1-4, 1 - good, 4 - poor

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SELECTION FOR RESISTANCE TO C. HIBISCI

All plants in both nurseries grown in 1953 were inoculated twice with a spore suspension of C. hibisci. A hypodermic needle was used to puncture and apply the inoculum about 1 inch below the growing point. Classifications for reaction to the fungus were made 7-10 days after inoculation. A final classification was made just prior to harvest of the seed. In the final classification the plants were placed in four classes: HR - highly resistant, R - resistant, S - susceptible and CS - completely susceptible. Results of this final classification of lines in the spring and fall nurseries are given in Tables 2 and 3. Each selfed progeny of each line is listed separately to show the segregation of progenies within lines. The several progenies within a line are sibs. Table 3a is a summary of the classification of the progenies of the S_3 and S_4 Salvadorian lines in fall nursery.

Differences among lines and among progenies of the same line in the spring nursery are evident in Table 2. Even though all progenies of 78 of the 93 Salvadorian lines in the spring nursery were derived from HR parental plants, there was considerable segregation. However, in most lines the segregation was HR-R with few S and CS plants found. All plants in three progenies of 14 lines (J-32, J-96, J-106, J-107, J-108, J-109, J-110, J-111, J-112, J-113, J-114, J-115, J-121 and J-177) were HR. All plants in two progenies of 6 lines (J-35, J-98, J-150, J-155, J-171 and J-173) were HR, and all plants of one progeny of 29 lines (J-1, J-12, J-20, J-36, J-41, J-92, J-95, J-97, J-99, J-101, J-103, J-105, J-116, J-124, J-143, J-145, J-147, J-149,

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J-153, J-154, J-157, J-160, J-161, J-167, J-170, J-175, J-180, J-184, J-186) were HR. In all other lines no progeny was found where all plants were HR. These results indicated that certain of the Salvadorian lines, especially the 14 where all plants of three progenies were HR, were homozygous for a high degree of resistance. The data also indicated that further selection between and within progenies for the HR reaction should give homozygous resistance in other lines.

Table 2 also shows that 15 R or S lines (J-5, J-7, J-10, J-15, J-19, J-27, J-35, J-38, J-39, J-57, J-93, J-151, J-158, J-159 and J-179) were planted in the spring nursery. Plants considered HR were found in all these lines except J-5, J-7, J-38, J-39, J-158 and J-179. All plants of two progenies of J-35 were HR though the parental plants were R.

All of the lines listed in Table 2 except three (J-38, J-163 and J-179) were carried to the fall nursery. In Table 2 an asterisk at the end of a progeny indicates that the line was carried to the fall nursery from this progeny. In most instances, each line was continued from the most resistant progeny.

Table 3 of the classification in the fall nursery again shows wide variation among the Salvadorian lines and among progenies of these same lines. Table 3a was prepared to show the progeny classification of the Salvadorian lines.

It had been expected that most of the 14 lines in which all plants in 3 progenies were HR in the spring nursery would continue to be HR in the fall nursery. Tables 3 and 3a show that only 4 of these lines (J-96, J-106, J-112 and J-115) remained HR in all progenies. One progeny was segregating in J-32, J-109, J-110, J-111 and J-114, two

1-153, 1-154, 1-157, 1-160, 1-161, 1-167, 1-170, 1-175, 1-180, 1-184, 1-186) were HR. In all other lines no progeny was found where all plants were HR. These results indicated that certain of the Salvadorian lines, especially the 14 where all plants of three progenies were HR, were homozygous for a high degree of resistance. The data also indicated that further selection between and within progenies for the HR reaction should give homozygous resistance in other lines.

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progenies were segregating in J-107, J-113, J-121 and J-177, while all five progenies were segregating in J-108.

The breakdown of certain of these lines is difficult to explain. Lines numbered consecutively from J-106 through J-115 all originated from one apparently resistant open-pollinated selection made in the diseased Hobe Sound planting in 1951. No susceptible plants were found in the progeny from this plant in the spring nursery of 1952. Ten S_1 selections in this progeny were labeled J-106 through J-115 and planted in the fall 1952 nursery. All plants in the S_1 generation were HR (1952 annual report). As noted previously, 3 sib S_2 selections of each line were carried to the spring 1953 nursery and all plants in all ten lines were HR. Then in the S_3 generation, segregation occurred in seven of the lines. Of this seven, only J-108 and J-114 gave lesions immediately following inoculation and eventually S or CS plants. In the other five the disease appeared very late at the capsule ripening stage; the symptoms being either small lesions on the stem or capsules near the tip of the plant.

In addition to the 4 lines mentioned above, all plants in 5 progenies were HR in 3 other lines (J-150, J-155 and J-160). The data in Tables 3 and 3a on the other S_3 and S_4 Salvadorian lines show that all plants were HR in from 1 to 4 of the progenies in all but 24 of the lines. HR plants were found in many of these 24 lines.

The last portion of Table 3 gives the classification of lines derived from crosses of Salvadorian with other varieties. A few of these lines looked good with all plants being HR. The extreme susceptibility of Tingo Maria, Javanese and Manchurian will make the selection of HR types difficult.

progenies were segregating in 1-107, 1-113, 1-121 and 1-177, while all five progenies were segregating in 1-108.

The breakdown of certain of these lines is difficult to explain. Lines numbered consecutively from 1-106 through 1-115 all originated from one apparently resistant open-pollinated selection made in the diseased Hobe Sound planting in 1951. No susceptible plants were found in the progeny from this plant in the spring nursery of 1952. Ten S_1 selections in this progeny were labeled 1-106 through 1-115 and planted in the fall 1952 nursery. All plants in the S_1 generation were RR (1952 annual report). As noted previously, 3 ear S_2 selections of each line were carried to the spring 1953 nursery and all plants in all ten lines were RR. Then in the S_3 generation, segregation occurred in seven of the lines. Of this seven, only 1-108 and 1-114 gave lesions immediately following inoculation and eventually 8 or 09 plants. In the other five the disease appeared very late at the capsule ripening stage; the symptoms being either small lesions on the stem or capsules near the tip of the plant.

In addition to the 4 lines mentioned above, all plants in 5 progenies were RR in 3 other lines (1-150, 1-155 and 1-160). The data in Tables 3 and 3a on the other S_3 and S_4 Salvadorian lines show that all plants were RR in from 1 to 4 of the progenies in all but 24 of the lines. RR plants were found in many of these 24 lines.

The first portion of Table 3 gives the classification of lines derived from crosses of Salvadorian with other varieties. A few of these lines looked good with all plants being RR. The extreme susceptibility of Tinga Maria, Javanese and Nanburian will make the selection of RR types difficult.

Table 2. Classification of kenaf lines following two inoculations with C. hibisci. Spring nursery 1953

Line	Parent Classification	Progeny Classification Number of Plants HR	R	S	CS
S_3 Generation					
Salvador lines					
J-1	HR	9	0	0	0*
"	"	5	1	0	0
"	"	12	2	0	0
J-4	"	14	2	0	0
"	"	10	2	0	0*
"	"	17	4	0	0
J-5	S	0	2	0	0
"	"	0	5	3	0
"	"	0	9	10	0*
J-7	R	0	18	0	0*
"	"	0	15	1	0
J-9	HR	4	16	4	0
"	"	8	0	5	0*
"	"	4	6	7	0
J-10	R	3	11	6	0*
J-12	HR	20	0	0	0*
"	"	14	5	0	0
"	"	5	5	0	0
J-15	R	16	5	0	0*
"	"	6	4	2	1
J-19	"	7	11	1	4
"	"	5	8	2	0*
J-20	HR	14	0	0	0*
"	"	16	3	0	0
J-21	"	14	4	0	0
"	"	11	8	0	0*
J-22	"	16	3	0	0*
"	"	19	10	0	0
"	"	8	9	0	0
S_2 Generation					
Salvador lines					
J-27	R	6	7	0	0*
"	"	1	19	0	0
J-32	HR	20	0	0	0
"	"	16	0	0	0
"	"	13	0	0	0*
J-35	R	17	0	0	0*
"	"	18	0	0	0
J-36	HR	15	0	0	0*
"	"	9	9	0	0
"	"	9	10	0	0

Table 2. Classification of lower lines following two inoculations with *C. kikiandi*. Spring nursery 1953

Line	Parent Classification	Number of Plants			Progeny Classification
		MR	S	S	CS
3g Generation					
Selvador Lines					
1-1	MR	9	0	0	0*
"	"	5	1	0	0
"	"	12	2	0	0
1-4	"	14	2	0	0
"	"	10	2	0	0*
"	"	17	1	0	0
1-5	"	0	2	0	0
"	"	0	5	3	0
"	"	0	9	10	0*
1-7	R	0	18	0	0*
"	"	0	19	1	0
1-9	MR	4	16	4	0
"	"	8	0	5	0*
"	"	4	6	7	0
1-10	R	3	11	6	0*
1-12	MR	20	0	0	0*
"	"	14	5	0	0
"	"	5	5	0	0
1-15	R	16	5	0	0*
"	"	6	4	2	1
1-19	"	7	11	1	1
"	"	5	8	2	0*
1-20	MR	14	0	0	0*
"	"	16	3	0	0
1-21	"	14	4	0	0
"	"	11	8	0	0*
1-22	"	16	3	0	0*
"	"	9	10	0	0
"	"	8	9	0	0
3g Generation					
Selvador Lines					
1-2 ?	R	6	7	0	0*
"	"	1	19	0	0
1-32	MR	30	0	0	0
"	"	16	0	0	0
"	"	13	0	0	0*
1-35	R	17	0	0	0*
"	"	16	0	0	0
1-36	MR	15	0	0	0*
"	"	9	9	0	0
"	"	9	10	0	0

Table 2 (Cont.)

J-37	HR	18	3	0	0*
"	"	9	10	0	0
J-38	R	0	12	3	0
J-39	"	0	16	5	0*
"	"	0	10	6	0
J-41	HR	21	0	0	0*
"	"	13	2	3	1
J-48	"	19	2	0	0*
J-52	"	9	4	1	0
"	"	11	6	1	0*
J-57	R	12	11	0	0*
"	"	0	15	2	5
J-62	HR	17	0	1	1*
"	"	12	2	2	3
"	"	11	3	4	0
J-92	"	15	0	0	0*
"	"	10	1	0	0
"	"	0	1	0	0
J-93	R	6	3	4	0*
"	"	6	10	2	0
J-94	HR	15	0	1	2*
"	"	15	0	1	5
"	"	19	0	0	3
J-95	"	16	0	0	0*
"	"	13	0	1	2
"	"	12	2	3	1
J-96	"	15	0	0	0
"	"	11	0	0	0
"	"	17	0	0	0*
J-97	"	17	0	0	0*
"	"	12	5	2	0
"	"	16	1	1	1
J-98	"	21	0	0	0*
"	"	21	0	0	0
"	"	20	4	1	0
J-99	"	11	0	0	0*
J-100	"	16	2	1	0*
"	"	15	2	2	0
"	"	14	2	0	0
J-101	"	19	0	0	0*
"	"	14	1	1	5
"	"	11	0	1	3
J-102	"	12	0	0	4*
J-103	"	17	0	0	0*
"	"	15	1	1	3
"	"	16	0	2	2
J-104	"	13	10	0	0*
J-105	"	14	0	0	0*

Table 2 (Cont.)

1-97	"	18	3	0	0	0	0*
"	"	9	10	0	0	0	0
1-98	"	0	12	0	3	0	0
1-99	"	0	16	0	5	0	0*
"	"	0	10	0	6	0	0
1-41	"	21	0	0	0	0	0*
"	"	13	2	0	3	1	0
1-43	"	19	3	0	0	0	0*
1-32	"	9	4	0	1	0	0
"	"	11	6	0	1	0	0*
1-87	"	12	11	0	0	0	0*
"	"	0	15	0	3	0	0
1-52	"	17	0	0	1	1	1*
"	"	12	2	0	2	0	0
"	"	11	3	0	4	0	0
1-92	"	15	0	0	0	0	0*
"	"	10	1	0	0	0	0
1-93	"	6	3	0	4	0	0
"	"	6	10	0	2	0	0
1-94	"	15	0	0	1	1	1*
"	"	15	0	0	0	0	0
"	"	19	0	0	0	0	0
1-95	"	14	0	0	1	0	0*
"	"	15	0	0	1	0	0
"	"	12	2	0	3	1	0
1-96	"	15	0	0	0	0	0
"	"	11	0	0	0	0	0*
1-97	"	17	0	0	0	0	0*
"	"	12	5	0	2	0	0
1-98	"	16	1	0	1	1	0
"	"	21	0	0	0	0	0*
"	"	23	0	0	1	0	0
1-99	"	13	0	0	1	0	0*
1-100	"	16	2	0	1	0	0*
"	"	15	2	0	2	0	0
1-101	"	14	2	0	0	0	0
"	"	19	0	0	0	0	0*
"	"	14	1	0	1	5	0
1-102	"	11	0	0	1	3	0
1-103	"	12	0	0	0	4*	0
"	"	17	0	0	1	0	0*
"	"	15	1	0	1	3	0
1-104	"	13	10	0	0	2	0*
1-105	"	14	0	0	0	0	0*

Table 2 (Cont.)

J-106	HR	23	0	0	0
"	"	28	0	0	0
"	"	25	0	0	0*
J-107	"	19	0	0	0
"	"	25	0	0	0
"	"	24	0	0	0*
J-108	"	25	0	0	0*
"	"	19	0	0	0
"	"	27	0	0	0
J-109	"	25	0	0	0*
"	"	24	0	0	0
"	"	24	0	0	0
J-110	"	24	0	0	0*
"	"	27	0	0	0
"	"	15	0	0	0
J-111	"	26	0	0	0
"	"	25	0	0	0
"	"	25	0	0	0*
J-112	"	23	0	0	0
"	"	24	0	0	0*
"	"	20	0	0	0
J-113	"	22	0	0	0
"	"	24	0	0	0*
"	"	20	0	0	0
J-114	"	21	0	0	0*
"	"	23	0	0	0
"	"	25	0	0	0
J-115	"	25	0	0	0*
"	"	25	0	0	0
"	"	22	0	0	0
J-116	"	17	0	0	0
"	"	13	6	4	0
"	"	4	6	3	4*
J-117	"	8	5	4	7*
J-118	"	4	8	2	2
"	"	11	1	4	6*
"	"	0	16	5	3
J-120	"	17	1	2	1*
J-121	"	20	0	0	0*
"	"	24	0	0	0
"	"	20	0	0	0
J-122	"	21	1	0	0*
"	"	9	3	3	6
"	"	4	4	5	4
J-123	"	10	4	4	2*
J-124	"	21	0	0	0*
J-143	"	15	0	0	0*
J-144	"	20	1	0	0*

Table 2 (Cont.)

| | | |

Table 2 (Cont.)

J-145	HR	20	0	0	0*
"	"	21	2	0	0
"	"	18	2	0	0
J-147	"	17	0	0	0*
"	"	16	0	3	0
J-148	"	9	12	0	0
"	"	12	5	0	0*
"	"	3	17	0	0
J-149	"	20	0	0	0*
"	"	15	1	3	4
"	"	11	3	2	4
J-150	"	26	0	0	0*
"	"	23	0	0	0
"	"	17	3	0	0
J-151	"	0	22	0	0
"	R	2	10	10	4*
"	"	5	21	0	0
J-152	HR	17	4	0	0
"	"	15	3	0	0
"	"	18	6	0	0*
J-153	"	20	0	0	0*
"	"	17	4	2	0
"	"	17	4	2	0
J-154	"	24	0	0	0
"	"	15	2	2	1
"	"	16	0	3	5*
J-155	"	25	0	0	0*
"	"	15	0	0	0
"	"	12	0	3	2
J-157	"	22	0	0	0*
"	"	21	5	0	0
"	"	4	17	2	0
J-158	R	0	16	4	2*
"	"	0	10	8	5
J-159	"	3	11	2	0*
"	"	0	15	2	2
J-160	HR	24	0	0	0*
"	"	14	1	0	0
"	"	11	1	1	0
J-161	"	25	0	0	0*
"	"	20	2	0	0
"	"	8	5	0	0
J-162	"	18	1	0	1*
J-163	"	1	20	0	0
J-164	"	17	6	0	0*
"	"	5	5	2	4
"	"	1	5	12	3
J-165	"	12	3	0	0
"	"	13	5	0	0
"	"	8	6	1	0*

Table 2 (Cont.)

| | | |

Table 2 (Cont.)

J-166	HR	19	1	0	0
"	"	21	1	0	0*
"	"	11	3	0	0
J-167	"	17	0	0	0*
"	"	19	1	0	0
"	"	11	2	0	0
J-168	"	17	2	0	0*
J-170	"	19	0	0	0*
"	"	21	1	0	0
"	"	15	1	0	0
J-171	"	20	0	0	0
"	"	18	0	0	0*
"	"	15	1	0	0
J-172	"	15	0	0	1*
"	"	11	0	1	3
"	"	14	0	2	3
J-173	"	20	0	0	0
"	"	15	0	0	0*
"	"	13	1	0	0
J-174	"	14	1	0	0
"	"	14	1	0	0*
"	"	12	2	0	0
J-175	"	18	0	0	0*
"	"	12	3	0	0
"	"	11	3	4	3
J-176	"	11	3	0	0
"	"	12	5	2	0
"	"	16	2	1	4*
J-177	"	24	0	0	0*
"	"	19	0	0	0
"	"	14	0	0	0
J-179	R	0	15	0	0
"	"	0	19	20	0
J-180	HR	13	0	0	0*
"	"	13	4	2	0
"	"	13	3	4	3
J-184	"	19	0	0	0*
"	"	18	1	0	0
"	"	11	11	0	0
J-185	"	20	1	0	0*
"	"	19	6	0	0
J-186	"	21	0	0	0*
"	"	17	1	0	0
"	"	16	1	0	0
F_3 Generation Salvador x Tingo Maria					
JI-1	"	14	0	0	0
"	"	13	1	0	0*
JI-4	R	22	2	0	0*
"	"	16	5	0	0*

*Line was continued in next generation from this progeny. See Table 3.

Table 2 (Cont.)

1-156		HH	19	1	0	0	
"		"	21	1	0	0	0*
"		"	17	3	0	0	0
1-157		"	17	0	1	0	0*
"		"	16	1	0	0	0
"		"	11	2	0	0	0
1-158		"	17	2	0	0	0*
1-170		"	19	0	0	0	0*
"		"	21	1	0	0	0
"		"	15	1	0	0	0
1-171		"	20	0	0	0	0
"		"	18	0	0	0	0*
"		"	15	1	0	0	0
1-172		"	15	0	0	0	1*
"		"	11	0	0	1	3
"		"	14	0	0	2	3
1-173		"	20	0	0	0	0
"		"	15	0	0	0	0*
"		"	13	1	0	0	0
1-174		"	14	1	0	0	0
"		"	14	1	0	0	0*
"		"	12	2	0	0	0
1-175		"	15	0	0	0	0*
"		"	12	3	0	0	0
1-176		"	11	3	0	4	3
"		"	12	3	0	2	0
"		"	16	2	0	1	1*
1-177		"	14	0	0	0	0*
"		"	13	0	0	0	0
"		"	12	0	0	0	0
1-179		"	0	15	0	0	0
"		"	0	19	0	0	0
1-180		HH	13	0	0	0	0*
"		"	13	4	0	2	0
"		"	13	2	0	4	3
1-184		"	19	0	0	0	0*
"		"	18	1	0	0	0
"		"	17	1	0	0	0
1-185		"	20	1	0	0	0*
"		"	19	0	0	0	0
1-186		"	21	0	0	0	0*
"		"	17	1	0	0	0
"		"	16	1	0	0	0
F3 Generation							
Salvador x Tingo Maria							
11-1		"	14	0	0	0	0
"		"	13	1	0	0	0*
11-4		R	22	3	0	0	0*
"		"	16	5	0	0	0*

Line was continued in next generation from this progeny. See Table 3.

Table 3. Classification of kenaf lines following two inoculations with C. hibisci. Fall nursery 1953.

Line	Parent Classification	Progeny Classification Number of Plants HR	R	S	CS
S_4 Generation Salvador lines					
J-1	HR	3	0	0	0
"	"	1	0	0	0
"	"	10	1	0	0
"	"	3	1	0	0
"	"	5	2	0	0
J-4	"	22	0	0	0
"	"	20	2	0	0
"	"	19	3	0	0
"	"	18	3	0	0
"	"	18	3	0	1
J-5	S	0	8	5	5
"	"	0	9	5	6
"	"	0	7	10	11
J-7	R	0	11	1	2
"	"	0	16	2	0
J-9	HR	8	0	0	0
"	"	19	1	0	0
"	"	18	0	2	0
"	"	21	1	0	0
"	"	16	1	3	6
J-10	"	14	1	0	0
"	"	14	2	0	1
J-12	"	20	2	0	0
"	"	10	4	0	0
"	"	18	3	0	1
"	"	7	3	2	3
"	"	3	2	2	3
J-15	"	17	2	0	0
"	"	12	4	0	0
"	"	5	3	0	3
"	"	9	3	1	6
"	"	11	2	3	5
J-19	"	19	0	0	0
"	"	10	0	3	1
"	"	10	1	5	3
"	"	6	3	4	7
J-20	"	19	1	0	0
"	"	17	2	0	0
"	"	5	0	1	1
"	"	13	2	1	4
"	"	3	13	4	3
J-21	"	12	0	0	3
"	"	17	3	1	0
"	"	16	1	1	3
"	"	19	4	2	0
"	"	7	0	5	6

Table 3. Classification of Seed Lines following two inoculations with O. bifidus. Ball nursery 1953.

Line	Parent Classification	Progeny Classification Number of Plants			
		BR	S	R	CR
B. Generation Selfed Lines					
1-1	BR	3	0	0	0
"	"	1	0	0	0
"	"	10	1	0	0
"	"	3	1	0	0
"	"	5	2	0	0
1-4	"	22	0	0	0
"	"	20	2	0	0
"	"	19	3	0	0
"	"	18	3	0	0
"	"	18	3	0	1
1-5	S	0	8	5	5
"	"	0	9	5	6
"	"	0	7	10	11
1-7	R	0	14	1	2
"	"	0	15	2	0
1-9	BR	8	0	0	0
"	"	19	1	0	0
"	"	18	0	2	0
"	"	21	1	0	0
"	"	16	1	3	6
1-10	"	14	1	0	0
"	"	14	2	0	1
1-12	"	20	2	0	0
"	"	20	4	0	0
"	"	15	3	0	1
"	"	7	3	2	3
"	"	3	2	2	3
1-15	"	17	2	0	0
"	"	12	4	0	0
"	"	5	3	1	3
"	"	9	3	1	6
"	"	11	2	3	5
1-19	"	19	0	0	0
"	"	10	0	3	1
"	"	10	1	5	3
"	"	6	3	4	7
1-20	"	19	1	0	0
"	"	17	2	0	0
"	"	5	0	1	1
"	"	13	2	1	4
"	"	3	13	1	3
1-21	"	12	0	0	3
"	"	17	3	1	0
"	"	16	1	1	3
"	"	19	4	2	0
"	"	7	0	5	6

Table 3 (Cont.)

J-22	HR	11	5	0	0
"	"	9	5	0	0
"	"	24	0	0	3
"	"	13	0	0	6
"	"	14	0	3	6
S_3 Generation Salvador lines					
J-27	"	0	20	0	0
"	"	0	14	0	0
J-32	"	22	0	0	0
"	"	19	0	0	0
"	"	17	0	0	0
"	"	14	0	0	0
"	"	24	1	0	0
J-35	"	12	2	0	0
"	"	8	0	1	1
"	"	12	4	0	3
"	"	10	3	5	5
"	"	6	3	2	6
J-36	"	11	0	0	0
"	"	17	1	0	0
"	"	16	1	0	0
"	"	15	2	0	0
"	"	11	3	0	0
J-37	"	24	1	0	0
"	"	19	1	0	0
"	"	14	3	0	0
"	"	24	4	0	0
"	"	19	5	0	0
J-39	"	0	9	5	0
"	R	1	5	3	0
J-41	HR	18	0	0	0
"	"	17	0	0	0
"	"	15	0	0	0
"	"	11	0	0	0
"	"	14	3	0	0
J-48	"	10	2	3	0
"	"	8	0	4	6
"	"	5	0	3	6
"	"	3	0	3	3
"	"	2	4	2	1
J-52	"	14	0	0	0
"	"	1	0	0	0
"	"	8	0	3	2
"	"	3	0	1	3
J-57	"	1	5	12	2
"	"	0	7	15	2
"	"	0	3	10	3
"	R	0	14	2	0

Table 3 (Cont.)

| | | |

J-62	HR	20	0	1	0
"	"	19	2	0	0
"	"	18	2	1	2
"	"	16	0	1	6
"	"	5	2	3	4
J-92	"	16	0	0	0
"	"	15	0	0	0
"	"	11	0	0	0
"	"	11	0	0	0
"	"	17	1	0	0
J-93	"	12	0	0	0
"	"	7	0	0	0
"	"	12	0	4	3
"	"	3	0	2	0
"	"	6	2	6	0
J-94	"	21	6	0	0
"	"	17	0	0	0
"	"	14	0	2	0
"	"	14	0	2	1
"	"	17	0	4	2
J-95	"	19	0	0	0
"	"	18	0	0	0
"	"	14	0	0	0
"	"	18	1	0	0
"	"	9	1	0	0
J-96	"	26	0	0	0
"	"	22	0	0	0
"	"	20	0	0	0
"	"	19	0	0	0
"	"	18	0	0	0
J-97	"	20	0	0	0
"	"	12	0	0	0
"	"	11	0	0	0
"	"	18	1	0	0
"	"	14	1	0	0
J-98	"	21	0	0	0
"	"	20	0	0	0
"	"	11	2	0	0
"	"	16	3	0	0
"	"	14	2	1	1
J-99	"	16	0	0	0
"	"	19	1	0	0
"	"	17	1	0	0
"	"	16	1	0	0
"	"	10	2	0	0
J-100	"	23	0	0	0
"	"	19	0	0	0
"	"	17	0	0	0
"	"	25	0	4	0
"	"	5	0	5	1
J-101	"	20	0	0	0
"	"	18	0	0	0
"	"	17	0	0	0
"	"	19	0	2	0
"	"	15	0	2	0

| | | |

J-102	HR	11	0	0	1
"	"	9	0	0	2
"	"	9	0	3	2
"	"	7	0	2	2
"	"	3	1	2	0
J-103	"	20	0	0	0
"	"	19	0	0	0
"	"	15	0	0	0
"	"	14	0	0	0
"	"	16	0	1	1
J-104	"	11	0	0	0
"	"	21	1	0	0
"	"	12	2	0	0
"	"	12	3	0	0
"	"	15	4	0	0
J-105	"	8	0	0	0
"	"	9	0	3	0
J-106	"	15	0	0	0
"	"	13	0	0	0
"	"	11	0	0	0
"	"	8	0	0	0
"	"	5	0	0	0
J-107	"	15	0	0	0
"	"	10	0	0	0
"	"	4	0	0	0
"	"	9	1	0	0
"	"	18	3	0	0
J-108	"	13	7	0	0
"	"	11	11	0	0
"	"	7	11	0	0
"	"	5	2	4	7
"	"	4	4	5	4
J-109	"	11	0	0	0
"	"	11	1	0	0
"	"	10	2	0	0
"	"	17	3	0	0
"	"	10	3	0	0
J-110	"	25	0	0	0
"	"	21	0	0	0
"	"	17	0	0	0
"	"	17	0	0	0
"	"	20	1	0	0
J-111	"	19	0	0	0
"	"	15	0	0	0
"	"	12	0	0	0
"	"	10	0	0	0
"	"	10	5	0	0
J-112	"	21	0	0	0
"	"	20	0	0	0
"	"	16	0	0	0
"	"	14	0	0	0
"	"	3	0	0	0

| | | |

J-113	HR	23	0	0	0
"	"	18	0	0	0
"	"	7	0	0	0
"	"	21	1	0	0
"	"	20	2	0	0
J-114	"	16	0	0	0
"	"	13	0	0	0
"	"	12	0	0	0
"	"	9	0	0	0
"	"	20	2	2	0
J-115	"	22	0	0	0
"	"	17	0	0	0
"	"	16	0	0	0
"	"	15	0	0	0
"	"	15	0	0	0
J-116	"	12	0	0	0
"	"	3	1	0	0
"	"	3	1	0	0
"	"	9	0	2	1
J-117	"	0	12	0	0
"	"	0	2	0	0
J-118	"	8	0	0	0
"	"	13	1	0	0
"	"	11	5	0	0
"	"	10	12	0	0
J-120	"	13	0	0	0
"	"	11	4	0	0
"	"	17	0	2	2
"	"	8	0	1	2
"	"	11	3	2	0
J-121	"	6	0	0	0
"	"	1	0	0	0
"	"	4	1	0	0
"	"	1	1	0	0
J-122	"	15	0	0	0
"	"	8	0	0	0
"	"	12	2	0	0
"	"	13	4	0	0
"	"	10	5	0	0
J-123	"	22	0	0	0
"	"	9	0	0	0
"	"	10	2	1	0
J-124	"	8	0	0	0
"	"	3	0	0	0
"	"	12	0	0	1
"	"	14	2	0	0
J-143	"	20	0	0	0
"	"	19	0	0	0
"	"	14	0	0	0
"	"	15	1	0	0
"	"	11	4	0	0

| | | |

J-144	HR	18	0	0	0
"	"	15	0	0	0
"	"	14	0	0	0
"	"	7	0	0	0
"	"	7	2	0	0
J-145	"	15	0	0	0
"	"	15	0	0	0
"	"	11	0	0	1
"	"	17	0	2	0
"	"	12	1	1	1
J-147	"	6	0	0	0
"	"	18	2	0	0
"	"	12	2	0	0
"	"	19	3	0	0
"	"	9	3	0	0
J-148	"	8	5	0	0
"	"	6	1	0	0
"	"	2	1	0	0
"	"	5	4	2	0
J-149	"	20	0	0	0
"	"	13	0	0	0
"	"	11	0	0	0
"	"	6	0	0	0
"	"	9	2	2	0
J-150	"	13	0	0	0
"	"	11	0	0	0
"	"	10	0	0	0
"	"	9	0	0	0
"	"	8	0	0	0
J-151	"	9	0	0	0
"	R	0	16	0	0
"	"	0	16	0	0
"	"	0	16	0	0
"	"	0	8	0	0
J-152	HR	22	0	0	0
"	"	21	1	0	0
"	"	21	4	0	0
"	"	16	2	5	0
"	"	13	3	4	0
J-153	"	14	0	0	0
"	"	13	0	0	0
"	"	8	0	0	0
"	"	7	0	0	0
"	"	5	1	0	0
J-154	"	13	0	0	0
"	"	11	0	0	0
"	"	8	0	0	0
"	"	21	1	0	0
"	"	15	2	4	0
J-155	"	18	0	0	0
"	"	16	0	0	0
"	"	16	0	0	0
"	"	15	0	0	0
"	"	13	0	0	0

| | | |

J-157	HR	18	0	0	0
"	"	6	0	0	0
"	"	8	1	0	0
"	"	6	1	0	0
"	"	2	0	2	3
"	"	1	3	6	4
J-158	R	0	8	6	3
"	"	0	0	3	2
J-159	HR	12	0	3	2
"	R	0	0	2	1
J-160	HR	16	0	0	0
"	"	6	0	0	0
"	"	5	0	0	0
"	"	3	0	0	0
"	"	2	0	0	0
J-161	"	16	0	0	0
"	"	12	0	0	0
"	"	12	0	0	0
"	"	9	0	0	0
"	"	9	0	0	0
"	"	9	2	0	0
J-162	"	20	0	0	0
"	"	20	0	0	0
"	"	18	0	0	0
"	"	17	0	2	0
"	"	3	0	1	0
J-164	"	20	0	0	0
"	"	18	0	1	1
"	"	16	1	1	0
"	"	12	1	1	0
"	"	13	1	2	0
J-165	"	8	0	0	0
"	"	8	0	2	0
"	"	3	0	2	0
"	"	5	1	3	0
"	"	3	0	4	1
J-166	"	10	0	0	0
"	"	8	0	0	0
"	"	15	1	0	0
"	"	11	1	0	0
"	"	3	0	3	0
J-167	"	13	0	0	0
"	"	6	0	0	0
"	"	5	1	0	0
"	"	12	4	0	0
"	"	6	2	0	0
J-168	"	13	0	0	0
"	"	13	0	0	0
"	"	18	1	0	0
"	"	12	1	0	0
"	"	10	1	0	0

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J-170	HB	22	0	0	0
"	"	14	0	0	0
"	"	8	0	0	0
"	"	13	1	0	0
"	"	14	0	2	0
J-171	"	19	0	0	0
"	"	5	0	0	0
"	"	21	1	0	0
"	"	17	1	0	0
"	"	10	4	3	2
J-172	"	16	1	1	0
"	"	20	0	3	0
"	"	15	0	2	0
"	"	13	0	2	0
"	"	13	0	4	1
J-173	"	24	0	0	0
"	"	21	0	0	0
"	"	20	0	0	0
"	"	16	0	0	0
"	"	16	1	0	0
J-174	"	20	0	0	0
"	"	11	0	0	0
"	"	8	0	0	0
"	"	13	1	0	0
J-175	"	12	0	0	0
"	"	4	0	0	0
"	"	14	1	0	0
"	"	12	0	1	0
"	"	6	2	2	7
J-176	"	17	0	0	0
"	"	13	1	0	0
"	"	14	0	1	0
"	"	2	1	0	0
"	"	12	2	2	0
J-177	"	12	0	0	0
"	"	10	0	0	0
"	"	5	0	0	0
"	"	16	1	0	0
"	"	10	3	2	0
J-180	"	13	0	0	0
"	"	12	2	0	0
"	"	12	2	0	0
"	"	11	0	1	0
"	"	7	0	1	0
J-184	"	23	0	0	0
"	"	10	0	0	0
"	"	9	0	0	0
"	"	11	2	0	0
"	"	1	1	0	0

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J-185	HR	10	2	4	0
"	"	9	3	2	0
"	"	14	2	1	2
"	"	6	2	2	0
"	"	3	1	3	2
J-186	"	13	1	2	0
"	"	14	1	1	2
"	"	11	5	4	0
"	"	13	0	4	6
"	"	0	7	3	2
S_2 Generation Salvador lines					
J-128	-	14	0	3	2
J-129	R	22	0	0	0
"	"	14	0	0	0
"	"	18	0	2	4
J-130	-	8	0	2	0
J-136	-	12	1	2	0
J-138	-	9	3	7	3
J-139	-	16	0	3	1
J-142	-	8	1	3	0
J-146	-	23	1	2	0
J-181	R	5	0	2	1
"	"	11	5	7	5
J-182	HR	23	0	0	0
"	"	21	0	2	0
"	"	26	1	1	0
J-183	"	18	3	5	2
"	"	18	4	5	0
"	"	11	2	3	3
J-187	R	7	4	3	7
"	"	9	3	5	6
"	"	4	6	4	7
F_4 Generation Salvador x Tingo Maria					
JI-1	HR	0	1	2	1
"	"	0	0	0	1
JI-4	"	3	0	0	0
"	"	1	0	0	0
"	"	7	1	1	1
"	"	9	3	2	2
"	"	3	9	0	0
"	"	4	18	0	0
F_3 Generation Salvador x Tingo Maria					
JI-2	R	0	6	4	7
"	"	0	5	4	12

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JI-3	R	10	5	2	3
"	"	8	5	3	1
JI-5	HR	8	0	0	0
"	"	14	1	0	0
JI-6	R	3	1	0	0
"	"	2	2	9	6
"	"	1	1	3	2
"	"	0	11	3	2
"	"	0	4	3	2
"	"	0	1	2	3
"	"	0	0	3	4

F_3 Generation
Salvador x
Javanese

JA-1	HR	26	0	0	0
JA-2	"	11	0	0	0
JA-3	"	6	2	4	2
JA-4	"	12	2	1	0
JA-5	R	0	4	7	13
JA-6	"	11	1	3	3
JA-7	"	9	4	2	0
JA-8	S	0	4	6	2
JA-9	"	0	1	4	2
JA-10	R	8	1	1	2
JA-11	"	5	0	1	1
JA-12	"	3	1	2	1
JA-13	"	0	3	0	0
JA-14	"	2	0	3	0
JA-15	"	0	1	7	3
JA-17	"	2	6	1	0
JA-18	"	1	0	0	0
JA-19	HR	1	3	9	6
JA-20	"	9	0	0	0
JA-21	"	2	0	0	0
JA-22	"	1	1	0	0
JA-23	"	9	1	0	1
JA-24	R	0	1	2	3
JA-25	"	0	0	0	3
JA-26	HR	17	1	0	0
JA-28	"	5	2	0	4
JA-29	"	5	0	1	1
JA-30	"	15	1	0	0

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JD-3	HR	26	0	0	0
JD-4	"	12	0	2	1
JD-5	"	5	0	1	1
JD-6	"	10	0	0	0
JD-7	"	24	0	0	0
JD-8	"	8	1	1	3
F_2 Generation Salvador x Javanese					
J x A	-	37	18	26	20
J x E	-	20	41	37	28
J x H	-	85	36	16	4
F_2 Generation Salvador x Tingo Maria					
J x I	-	4	0	0	0
F_2 Generation Salvador x Manchurian					
J x G	-	47	25	18	12

ID-3	BB	26	0	0	0
ID-4	"	12	0	2	1
ID-5	"	5	0	1	1
ID-6	"	10	0	0	0
ID-7	"	24	0	0	0
ID-8	"	8	1	1	3
F2 Generation					
Salvador x					
Jayuque					
1 x A	-	37	18	26	20
1 x B	-	20	11	37	28
1 x H	-	85	36	16	4
F2 Generation					
Salvador x					
Tlapa Maria					
1 x I	-	4	0	0	0
F2 Generation					
Salvador x					
Jamaurian					
1 x D	-	47	25	18	12

Table 3a. Summary of the classification of S_3 and S_4 Salvador lines of kenaf for resistance to C. hibisci. Fall nursery 1953.

	Number of Progenies					
	All Plants	Segregating				
Line	HR	HR-R	HR-S	HR-R-S	HR-S-CS	Other
J-115	5	0	0	0	0	0
J-96	5	0	0	0	0	0
J-155	5	0	0	0	0	0
J-112	5	0	0	0	0	0
J-106	5	0	0	0	0	0
J-150	5	0	0	0	0	0
J-160	5	0	0	0	0	0
J-161	5	1	0	0	0	0
J-110	4	1	0	0	0	0
J-173	4	1	0	0	0	0
J-32	4	1	0	0	0	0
J-92	4	1	0	0	0	0
J-153	4	1	0	0	0	0
J-144	4	1	0	0	0	0
J-41	4	1	0	0	0	0
J-111	4	1	0	0	0	0
J-103	4	0	0	0	1	0
J-114	4	0	0	1	0	0
J-149	4	0	0	1	0	0
J-174	3	1	0	0	0	0
J-95	3	2	0	0	0	0
J-97	3	2	0	0	0	0
J-113	3	2	0	0	0	0
J-184	3	2	0	0	0	0
J-143	3	2	0	0	0	0

Table 3a. Summary of the classification of S3 and S4 Salvador lines of kenaf for resistance to C. biticola. Fall nursery 1953.

Line	All Plants	Number of Progenies Segregating			
	HR	HR-R	HR-S	HR-L-S	HR-S-CS	Other
1-115	5	0	0	0	0	0
1-96	5	0	0	0	0	0
1-155	5	0	0	0	0	0
1-112	5	0	0	0	0	0
1-106	5	0	0	0	0	0
1-150	5	0	0	0	0	0
1-160	5	0	0	0	0	0
1-161	5	1	0	0	0	0
1-110	4	1	0	0	0	0
1-173	4	1	0	0	0	0
1-32	4	1	0	0	0	0
1-92	4	1	0	0	0	0
1-153	4	1	0	0	0	0
1-144	4	1	0	0	0	0
1-41	4	1	0	0	0	0
1-111	4	1	0	0	0	0
1-103	4	0	0	0	1	0
1-114	4	0	0	1	0	0
1-149	4	0	0	1	0	0
1-174	3	1	0	0	0	0
1-95	3	2	0	0	0	0
1-97	3	2	0	0	0	0
1-113	3	2	0	0	0	0
1-184	3	2	0	0	0	0
1-143	3	2	0	0	0	0

Table 3a (Cont.)

Line	Number of Progenies					
	All Plants	Segregating				
	HR	HR-R	HR-S	HR-R-S	HR-S-CS	Other
J-107	3	2	0	0	0	0
J-170	3	1	1	0	0	0
J-154	3	1	0	1	0	0
J-177	3	1	0	1	0	0
J-101	3	0	2	0	0	0
J-162	3	0	2	0	0	0
J-100	3	0	1	0	1	0
J-121	2	2	0	0	0	0
J-168	2	3	0	0	0	0
J-167	2	3	0	0	0	0
J-1	2	3	0	0	0	0
J-122	2	3	0	0	0	0
J-98	2	2	0	0	0	1
J-171	2	2	0	0	0	1
J-166	2	2	1	0	0	0
J-157	2	2	0	0	1	1
J-124	2	1	0	0	0	1
J-175	2	1	1	0	0	1
J-123	2	0	0	1	0	0
J-52	2	0	0	0	2	0
J-94	2	0	1	0	2	0
J-93	2	0	1	1	1	0
J-145	2	0	1	0	0	2
J-99	1	4	0	0	0	0
J-36	1	4	0	0	0	0
J-4	1	4	0	0	0	0

Table 3a (Cont.)

Line	All Plants	Segregating			
	HR	HR-R	HR-S	HR-R-S	Other
1-107	3	2	0	0	0
1-170	3	1	3	0	0
1-154	3	1	0	1	0
1-177	3	1	0	1	0
1-101	3	0	2	0	0
1-182	3	0	2	0	0
1-100	3	0	1	0	1
1-121	2	0	0	0	0
1-156	2	3	0	0	0
1-167	2	3	0	0	0
1-1	2	3	0	0	0
1-122	2	3	0	0	0
1-98	2	2	0	0	1
1-171	2	2	0	0	1
1-166	2	2	1	0	0
1-157	2	2	0	0	1
1-124	2	1	0	0	1
1-175	2	1	1	0	1
1-139	2	0	0	1	0
1-92	2	0	0	0	2
1-94	2	0	1	0	2
1-93	2	0	1	1	0
1-145	2	0	1	0	0
1-99	1	4	0	0	0
1-96	1	4	0	0	0
1-4	1	4	0	0	0

Table 3a (Cont.)

Line	All Plants	Number of Progenies Segregating				
	HR	HR-R	HR-S	HR-R-S	HR-S-CS	Other
J-104	1	4	0	0	0	0
J-147	1	4	0	0	0	0
J-109	1	4	0	0	0	0
J-118	1	3	0	0	0	0
J-9	1	2	1	0	0	1
J-116	1	2	0	0	1	0
J-152	1	2	0	2	0	0
J-176	1	2	1	1	0	0
J-180	1	2	2	0	0	0
J-120	1	1	0	1	2	0
J-105	1	0	1	0	0	0
J-19	1	0	0	0	1	2
J-164	1	0	0	3	1	0
J-165	1	0	2	1	1	0
J-151	1	0	0	0	0	4
J-37	0	5	0	0	0	0
J-148	0	3	0	1	0	0
J-108	0	3	0	0	0	2
J-12	0	2	0	0	0	3
J-15	0	2	0	0	0	3
J-20	0	2	0	0	1	2
J-22	0	2	0	0	1	2
J-10	0	1	0	0	0	1
J-35	0	1	0	0	1	3
J-62	0	1	1	0	1	2
J-172	0	0	3	1	1	0
J-185	0	0	0	3	0	2

Table 3a (Cont.)

Line	All Plants	Number of Segregating			
	RR	RR-S	RR-S	RR-S-SS	Other
1-104	1	4	0	0	0
1-147	1	4	0	0	0
1-109	1	4	0	0	0
1-118	1	3	0	0	0
1-9	1	2	1	0	1
1-116	1	2	0	1	0
1-152	1	2	0	2	0
1-176	1	2	1	1	0
1-180	1	2	2	0	0
1-120	1	1	0	1	2
1-105	1	0	1	0	0
1-19	1	0	0	0	1
1-164	1	0	0	3	1
1-165	1	0	2	1	1
1-151	1	0	0	0	4
1-37	0	5	0	0	0
1-148	0	3	0	1	0
1-108	0	3	0	0	2
1-12	0	2	0	0	3
1-15	0	2	0	0	3
1-20	0	2	0	0	2
1-22	0	2	0	0	2
1-10	0	1	0	0	1
1-35	0	1	0	0	3
1-62	0	1	1	0	2
1-172	0	0	3	1	0
1-185	0	0	0	3	2

Table 3a (Cont.)

Line	Number of Progenies					
	All Plants	Segregating				
	HR	HR-R	HR-S	HR-R-S	HR-S-CS	Other
J-21	0	0	0	2	1	2
J-186	0	0	0	2	1	2
J-48	0	0	0	1	3	1
J-102	0	0	0	1	2	2
J-159	0	0	0	0	1	1
J-39	0	0	0	1	0	1
J-57	0	0	0	0	0	4
J-5	0	0	0	0	0	3
J-7	0	0	0	0	0	2
J-27	0	0	0	0	0	2
J-117	0	0	0	0	0	2
J-158	0	0	0	0	0	2

Table 3a (Cont.)

Line	All Plants	Number of Progenies Segregating			
	RR	RR-R	RR-S	RR-S-OS	Other
1-21	0	0	2	1	2
1-186	0	0	2	1	2
1-48	0	0	1	3	1
1-102	0	0	1	2	2
1-199	0	0	0	1	1
1-39	0	0	1	0	1
1-37	0	0	0	0	4
1-5	0	0	0	0	3
1-7	0	0	0	0	2
1-27	0	0	0	0	2
1-117	0	0	0	0	2
1-156	0	0	0	0	2

SELECTION FOR RESISTANCE TO ROOT-KNOT NEMATODES

Some of the more advanced Salvadorian lines of kenaf developed in the breeding program are being tested for their resistance to root-knot by Dr. Summers. In addition, studies were continued with the hybrid of the root-knot resistant ornamental Hibiscus and kenaf.

Morton and Ledin in the book, 400 Plants of South Florida, describe and identify a red ornamental Hibiscus as H. eetveldianus. Apparently the root-knot resistant ornamental which has been successfully crossed with kenaf is the same species identified in the book. This is further substantiated by a report in 1948 by Toxopeus of the successful hybridization of H. eetveldianus with H. cannabinus in Java. He reported that all 25 F_1 plants obtained were sterile.

The almost complete sterility of the eetveldianus-cannabinus F_1 plants was reported in the 1952 annual report. Several thousand capsules on the F_1 plants in the 1952 fall nursery were harvested and carefully threshed. Several seed were obtained, but only two of these germinated in the greenhouse in the spring of 1953. These two plants were transplanted to the field during the summer. They flowered profusely in the fall and reciprocal crosses to some of the best Salvadorian lines were made. No seed were obtained in any of these crosses. These two plants were allowed to open pollinate and the ripe capsules harvested. Twenty seed have been obtained from one plant and 9 from the other. The seed set is thus some higher than in the F_1.

Differences between these two plants suggest that they are F_2 rather than apomicts. The most noticeable difference was in the number of spines on the capsules.

SELECTION FOR RESISTANCE TO ROOT-KNOT NEMATODES

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Norton and Ledin in the book, 400 Plants of South Florida, describe and identify a red ornamental Hibiscus as H. <u>schizopetalus</u>. Apparently the root-knot resistant ornamental which has been successfully crossed with kenaf is the same species identified in the book. This is further substantiated by a report in 1948 by Toxopeus of the successful hybridization of H. <u>schizopetalus</u> with H. <u>cannabinus</u> in Java. He reported that all 25 F_1 plants obtained were sterile.

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Differences between these two plants suggest that they are F_2 rather than sporulate. The most noticeable difference was in the number of spines on the capsules.

A row of the F_1 was grown in the fall nursery. Five seed have been obtained from these F_1 plants.

Several F_1 plants were treated with colchicine in an attempt to double the chromosome number. Buds of small plants were immersed in a .5% solution of colchicine for 2, 4, 8 and 16 hours. The appearance of the growth after the 8 and 16 hour treatments indicated that doubling had occurred. However, in each plant after the production of 2-3 polyploid leaves normal growth was resumed. None of the treated plants produced flowers in the polyploid sectors. Flowers were produced later in the normal growth sectors but no seed were obtained.

The F_1 hybrids grown in the 1952 fall nursery were all dug and the roots examined after the capsules were harvested. The roots of all plants were severely infested. Thus, in addition to sterility of the F_1, the recessive nature of the resistance further complicates the problem.

A Hibiscus introduction, PI200834 (X19), received in 1952 from Burma, has shown some tolerance to nematodes. It was crossed with kenaf in the fall of 1952. Seed were easily obtained, and the F_1 was grown in 1953. The behavior of the F_1 in relation to seed set is similar to the eetveldianus-cannabinus hybrids. Capsules remain on the plant and ripen, but very few seed are found. Eight seed were obtained from F_1 plants grown in 1953.

A row of the F_1 was grown in the fall nursery. Five seed have been obtained from these F_1 plants.

Several F_1 plants were treated with colchicine in an attempt to double the chromosome number. Buds of small plants were immersed in a .5% solution of colchicine for 2, 4, 8 and 16 hours. The appearance of the growth after the 8 and 16 hour treatments indicated that doubling had occurred. However, in each plant after the production of 2-3 polyploid leaves normal growth was resumed. None of the treated plants produced flowers in the polyploid sectors. Flowers were produced later in the normal growth sectors but no seed were obtained.

The F_1 hybrids grown in the 1952 fall nursery were all dug and the roots examined after the capsules were harvested. The roots of all plants were severely infected. Thus, in addition to sterility of the F_1, the recessive nature of the resistance further complicates the problem.

A Hybrigus introduction, PI200934 (XL9), received in 1952 from Burma, has shown some tolerance to nematodes. It was crossed with Kenaf in the fall of 1952. Seed were easily obtained, and the F_1 was grown in 1953. The behavior of the F_1 in relation to seed set is similar to the gertrudiana-cannabinus hybrids. Capsules remain on the plant and ripen, but very few seed are found. Eight seed were obtained from F_1 plants grown in 1953.

STRAIN TESTS

The first strain test involving lines developed in the breeding program was carried out at Belle Glade during the year. It was not possible to test all of the more advanced Salvadorian lines because of limited supplies of seed. Forty-eight of these lines and the parent variety were compared in a 7 x 7 simple lattice. The experiment was planted May 7-8. Each plot consisted of six rows 20 feet long with 7 inch spacing between rows. Seeding rate was 30 pounds per acre. A 0-8-16 plus minor elements fertilizer mixture was applied at a rate of 600 pounds at planting.

The experiment was harvested August 25-26, 110 days after planting. Two feet were removed from each end of all plots and the four center rows harvested for yield. From each plot, two subsamples of ten average size stalks were taken for fiber determinations. These two samples were decorticated on a hand fed decorticator. Percent fiber, total green yield, fiber yield and analyses of variance are presented in Table 4.

Differences in percent fiber, green yield and fiber yield were highly significant in the randomized block analyses. In terms of fiber yield, 22 lines outyielded the Salvadorian variety J, 2 were equal and 24 were lower in yield.

Differences between the lines tested in this experiment were so great until significance was readily obtained in the randomized block analysis. The gains in efficiency in the lattice analysis indicate the advisability of the use of the lattice in future strain tests when differences may not be as great.

STRAIN TESTS

The first strain test involving lines developed in the breeding program was carried out at Belle Glade during the year. It was not possible to test all of the more advanced Salvadorian lines because of limited supplies of seed. Forty-eight of these lines and the parent variety were compared in a 7 x 7 simple lattice. The experiment was planted May 7-8. Each plot consisted of six rows 20 feet long with 7 inch spacing between rows. Seeding rate was 30 pounds per acre. A 0-8-16 plus minor elements fertilizer mixture was applied at a rate of 600 pounds at planting.

The experiment was harvested August 25-26, 110 days after planting. Two feet were removed from each end of all plots and the four center rows harvested for yield. From each plot, two subsamples of ten average size stalks were taken for fiber determinations. These two samples were decorticated on a hand fed decorticator. Percent fiber, total green yield, fiber yield and analyses of variance are presented in Table 4.

Differences in percent fiber, green yield and fiber yield were highly significant in the randomized block analyses. In terms of fiber yield, 22 lines outyielded the Salvadorian variety 1, 2 were equal and 24 were lower in yield.

Differences between the lines tested in this experiment were so great until significance was readily obtained in the randomized block analysis. The gains in efficiency in the lattice analysis indicate the advisability of the use of the lattice in future strain tests when differences may not be as great.

Table 4. Yield and percent fiber of 48 Salvador lines of kenaf compared with the parent variety

Line	Percent Fiber	Yield, 1000 lbs./acre Total	Dry fiber
J-95	5.06	59.16	3.011
J-1	4.52	65.35	2.952
J-154	5.35	52.74	2.824
J-35	4.88	54.73	2.684
J-12	5.68	45.74	2.614
J-96	5.77	43.99	2.544
J-111	4.31	57.99	2.532
J-103	4.64	53.91	2.521
J-113	5.48	45.16	2.474
J-112	4.43	55.08	2.450
J-98	4.84	50.18	2.427
J-151	3.88	61.50	2.404
J-160	3.90	60.91	2.380
J-163	4.14	56.59	2.369
J-167	4.54	52.16	2.357
J-175	4.66	50.99	2.357
J-97	5.00	44.34	2.217
J-100	4.84	44.58	2.194
J-94	4.36	49.94	2.182
J-155	4.53	47.49	2.147
J-110	3.98	52.16	2.077
J-148	4.42	47.26	2.077
J-170	4.06	50.18	2.030
J-177	5.08	39.91	2.030
Variety J	4.42	46.33	2.030
J-37	4.21	44.93	2.007
J-92	3.58	48.08	1.984
J-101	4.26	46.33	1.984
J-32	4.06	47.84	1.937
J-106	4.46	43.18	1.937
J-157	4.62	41.42	1.937
J-121	4.22	44.34	1.867
J-153	3.67	50.76	1.867
J-171	3.68	50.18	1.832
J-184	4.32	40.84	1.774
J-107	3.86	45.16	1.750
J-114	4.30	40.49	1.750
J-186	4.39	39.32	1.750
J-109	3.64	45.51	1.657
J-166	4.23	39.91	1.645
J-176	4.10	38.74	1.587
J-172	3.43	45.16	1.564
J-152	3.85	40.26	1.540
J-164	3.58	42.24	1.505
J-165	3.71	40.26	1.494
J-180	4.52	32.32	1.494

Table 4. Yield and percent fiber of 48 Malvador lines or hybrids compared with the parent variety

Line	Percent fiber	Yield, 1000 lbs./acre Total	Per plant
1-95	5.06	59.15	3.011
1-1	4.52	65.35	2.952
1-154	5.35	52.74	2.824
1-35	4.88	54.73	2.674
1-12	5.68	45.74	2.611
1-96	5.77	43.99	2.544
1-111	4.31	57.99	2.539
1-103	4.64	53.91	2.521
1-113	5.48	45.18	2.474
1-112	4.43	55.08	2.450
1-98	4.84	50.18	2.427
1-151	3.88	61.50	2.404
1-150	3.90	60.91	2.380
1-103	4.14	51.39	2.369
1-167	4.34	52.15	2.357
1-175	4.66	50.99	2.377
1-97	5.00	44.34	2.217
1-10	4.54	44.38	2.154
1-94	4.35	49.54	2.153
1-155	4.53	47.49	2.147
1-110	3.96	58.15	2.077
1-148	4.42	47.26	2.077
1-170	4.06	50.18	2.036
1-177	5.08	39.91	2.030
Variety 1	4.42	46.33	2.030
1-37	4.21	44.93	2.007
1-92	3.56	46.08	1.981
1-101	4.26	46.33	1.984
1-32	4.06	47.84	1.937
1-105	4.46	43.19	1.927
1-157	4.62	42.42	1.959
1-121	4.22	41.34	1.857
1-153	3.87	45.95	1.807
1-171	3.68	48.58	1.788
1-164	4.32	40.14	1.734
1-107	3.86	45.16	1.750
1-114	4.30	40.49	1.740
1-146	4.39	39.32	1.750
1-109	3.64	43.21	1.657
1-156	4.29	39.91	1.645
1-176	4.10	36.74	1.507
1-172	3.43	43.16	1.514
1-152	3.85	40.25	1.540
1-154	3.58	42.74	1.529
1-165	3.71	40.26	1.494
1-180	4.32	32.32	1.454

J-108	3.95	36.41	1.435
J-174	3.57	31.16	1.120
J-105	3.28	34.19	1.097
LSD 05	1.01	14.79	.815
LSD 01	1.34	19.73	1.086
C.V.	11.6	15.6	19.9

Analysis of Variance - Lattice

		Mean Squares		
Source	DF	Percent Fiber	Total Yield	Fiber Yield
Replications	1	1.21	110.58	.74
Treatments	48	.66	82.11	.29
Blocks	12	.59	68.78	.23
Intra-block error	36	.11	30.06	.08

Analysis of Variance - Randomized Block

		Mean Squares		
Source	DF	Percent Fiber	Total Yield	Fiber Yield
Replications	1	1.21	110.58	.74
Treatments	48	.66**	82.11**	.29**
Error	48	.24	39.74	.12

**Highly significant

Gains in efficiency for lattice over randomized block:

Percent fiber:	177%
Total Yield:	116%
Fiber Yield:	125%

1-108	3.38	36.41	1.139
1-174	3.37	31.16	1.120
1-109	3.34	34.19	1.097
LSD 05	1.01	14.79	.015
LSD 01	1.34	19.79	1.056
C.V.	11.6	15.6	19.9

Analysis of Variance - Lattice

Source	DF	Percent Fiber	Mean Squares Total Yield	Fiber Yield
Replications	3	1.21	110.38	.74
Treatments	48	.66	82.11	.39
Blocks	12	.39	68.78	.23
Intra-block error	36	.11	30.06	.08

Analysis of Variance - Randomized Block

Source	DF	Percent Fiber	Mean Squares Total Yield	Fiber Yield
Replications	3	1.21	110.38	.74
Treatments	48	.55**	82.11**	.39**
Error	48	.24	39.74	.12

**Highly significant

Gains in efficiency for lattice over randomized block:

Percent Fiber:	177%
Total Yield:	116%
Fiber Yield:	132%

SEED INCREASE

Ten lines, J-1, J-12, J-35, J-95, J-98, J-103, J-111, J-112, J-154 and J-167 were planted in small isolation blocks in the Lake Worth area in early September for seed increase. These ten lines were selected on the basis of yield of fiber in the strain test and resistance to Colletotrichum in the spring nursery. Selfed seed from the spring nursery were used in the isolation plantings. The seed from only one progeny of a line was planted, and the line was continued in the fall nursery from the same progeny. Thus, the asterisk in Table 2 also indicates the progeny from which the isolation plantings were made.

The heavy rains during September and October limited growth in these isolation blocks, and J-35 and J-103 were washed out. In the remaining blocks, inoculations with Colletotrichum were made as in nursery plantings.

Tables 3 and 3a have shown that susceptible plants were found in all of the lines listed above except J-112. In the isolation plantings susceptible plants were found in all lines except J-111, J-112 and J-154. In isolation, a few susceptible plants were found in all 5 progenies of J-1, in 5 out of 6 progenies of J-12, in 3 out of 5 in J-95, in 2 out of 4 in J-167 and 2 out of 5 in J-98. The susceptible plants were rogued in each block before flowering.

Except for J-111 the seed produced in the isolation blocks was bulked. Since one progeny of J-111 segregated in the fall nursery, seed of this progeny in the isolation planting were harvested separately and the remainder of the seed bulked. From 1-2 pounds of seed were obtained 6f J-1, J-12, J-95, J-98, J-154 and J-167, while about 1/2

SEED INCREASE

Ten lines, 1-1, 1-12, 1-35, 1-95, 1-98, 1-103, 1-111, 1-112, 1-154 and 1-167 were planted in small isolation blocks in the Lake Worth area in early September for seed increase. These ten lines were selected on the basis of yield of fiber in the strain test and resistance to Golle-totrichum in the spring nursery. Selfed seed from the spring nursery were used in the isolation plantings. The seed from only one progeny of a line was planted, and the line was continued in the fall nursery from the same progeny. Thus, the asterisk in Table 2 also indicates the progeny from which the isolation plantings were made.

The heavy rains during September and October limited growth in these isolation blocks, and 1-35 and 1-103 were weaned out. In the remaining blocks, inoculations with Colletotrichum were made as in nursery plantings.

Tables 3 and 3a have shown that susceptible plants were found in all of the lines listed above except 1-112. In the isolation plantings susceptible plants were found in all lines except 1-111, 1-112 and 1-154. In isolation, a few susceptible plants were found in all 5 progenies of 1-1, in 5 out of 6 progenies of 1-12, in 3 out of 5 in 1-95, in 2 out of 4 in 1-167 and 2 out of 5 in 1-98. The susceptible plants were rogued in each block before flowering.

pound of seed of J-111 and J-112 were produced.

The seed produced in the blocks of J-111 and J-112 were placed in a larger planting (about 1/8 acre) in isolation in February 1954. Because of the complete resistance of J-96, J-106, J-115 and J-155 in the fall nursery, small blocks of these were also planted in isolation in February 1954.

A planting from o.p. seed was made at Fort Lauderdale in August. Three and one-half pounds of o.p. bulk seed of J-109, J-111, J-114 and J-115, all entire leaf and within the group of 10 lines outstanding in resistance to Colletotrichum in the spring nursery, were planted in 2 foot rows in a 1/3 acre block. No inoculations were made, but the divided leaf outcross plants were rogued. Approximately 75 pounds of seed were obtained.

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GENETIC STUDIES

Inheritance of resistance to C. hibisci:

Two F_1's of HR x CS lines and the parents were planted in the fall nursery. Classifications for resistance to C. hibisci following two inoculations are given below:

Line	Number of Plants HR	R	S	CS
J-107	79	4	0	0
J-55	0	0	0	58
J-107 x J-55	26	0	0	0
J-106	72	0	0	0
J-28	No germination			
J-106 x J-28	19	0	0	0

In both F_1's resistance was dominant. The CS line J-28 has been lost because the few seed available did not germinate. The reaction of J-28 in the 1952 fall nursery was similar to J-55. The study will be continued with J-107 and J-55. F_2 and backcross seed were produced with the J-107 x J-55 F_1 and have been planted in the spring 1954 nursery.

Inheritance of leaf shape: The F_1 and parents of divided x entire leaf lines were planted in the fall nursery. The following results were obtained:

Line	Number of Plants Divided	Entire
J-107	83	0
J-109	0	85
J-107 x J-109	12	0

The divided leaf shape was dominant. F_2 and backcross seed were produced and have been planted in the spring 1954 nursery.

Inheritance of resistance to Q. fibigeri:

Two F_1's of HA x GS lines and the parents were planted in the fall nursery. Classifications for resistance to Q. fibigeri following two inoculations are given below:

Line	Number of Plants			
	RR	R	S	SS
1-107	79	4	0	0
1-55	0	0	0	58
1-107 x 1-55	26	0	0	0
1-106	72	0	0	0
1-28	No germination			
1-106 x 1-28	19	0	0	0

In both F_1's resistance was dominant. The GS line 1-28 was been lost because the few seed available did not germinate. The reaction of 1-28 in the 1952 fall nursery was similar to 1-55. The study will be continued with 1-107 and 1-55. F_2 and backcross seed were produced with the 1-107 x 1-55 F_1 and have been planted in the spring 1954 nursery.

Inheritance of leaf shape: The F_1 and parents of divided x entire leaf lines were planted in the fall nursery. The following results were obtained:

Line	Number of Plants	
	Divided	Entire
1-107	83	0
1-109	0	85
1-107 x 1-109	12	0

The divided leaf shape was dominant. F_2 and backcross seed were produced and have been planted in the spring 1954 nursery.